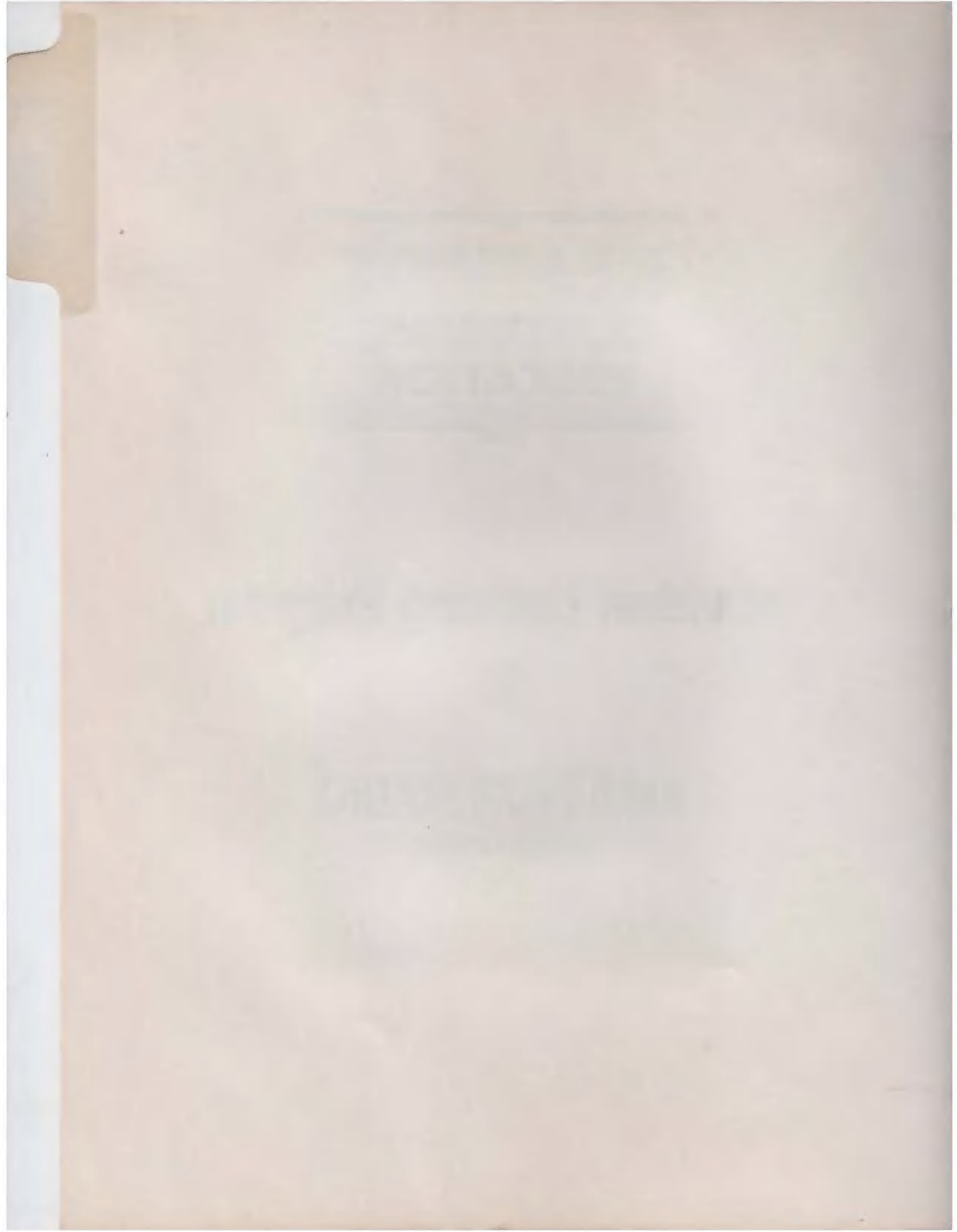


Individual Learning Program

In

AMATEUR RADIO

(NOVICE LICENSE)





Individual Learning Program

AMATEUR RADIO (NOVICE LICENSE)

Module 1 **RULES AND REGULATIONS** ER-3701

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MODULE OBJECTIVES

When you complete this module, you will be able to select:

1. The three main purposes for the existence of the amateur radio service.
2. The definition of the amateur radio service.
3. The definition of an amateur radio operator.
4. The definition of an amateur radio station.
5. The definition of a control operator.
6. The definition of a station license.
7. The definition of a primary station.
8. The novice frequencies within the 80-meter band.
9. The novice frequencies within the 40-meter band.
10. The novice frequencies within the 15-meter band.
11. The novice frequencies within the 10-meter band.
12. The type of emission a novice may use.
13. The maximum power a novice may use.
14. The length of time a novice license is good for.
15. The maximum height above ground an antenna structure may be at a given distance from an airport.
16. The responsibility of a station licensee and a control operator.
17. The times during a transmission when you must identify your station.
18. The type of one-way transmission that is not permitted.
19. Who is eligible for a novice license.

20. Who is eligible to obtain a station license.
21. The definition of a log.
22. The information required in a log.
23. The length of time you must retain a log.
24. Four methods of measuring the frequency of the emissions from a transmitter.
25. Who an amateur station may communicate with.
26. The number of days you have to answer a Notice of Violation from the FCC.
27. A statement concerning when station operation may be restricted by the FCC.
28. The types of communications which are prohibited.
29. The time when third-party traffic is permitted.
30. The reasons the FCC may modify a license.
31. The place where the operator license must be kept.
32. The place where the station license must be kept.

MODULE PRETEST

This examination will test your knowledge of the material presented in this module. For each question, circle the multiple choice answer (A, B, C, D, or E) you feel is most correct. When you have completed these questions, compare your answers with the correct ones that appear under "Pretest Answers," which follows.

- If you miss more than six questions, read this whole module.
 - If you have less than six incorrect answers, you may either study those frames pertaining to the questions you missed (the number in parenthesis, following the correct answer, refers you to the proper frame) or you can skip this module and proceed to the next module.
1. Which of the following is **not** one of the main purposes for the existence of the amateur radio service?
 - A. To create a reservoir of trained radio operators and electronics experts.
 - B. To provide a voluntary, non-commercial communication service for the public that is especially useful during an emergency.
 - C. To advance the state of the art.
 - D. To provide a voluntary, commercial communication service for the public that is especially useful during an emergency.
 - E. All of the above.
 2. Select the best definition of the amateur radio service.
 - A. The amateur radio service is a radio communication service of self-training, intercommunication, and non-technical investigation carried on by amateur radio operators.
 - B. The amateur radio service is a group of people interested in communicating with other people.
 - C. The amateur radio service is a radio communication service of self-training, intercommunication, and technical investigation carried on by amateur radio operators.
 - D. The amateur radio service is a radio communication service provided for business purposes.
 - E. None of the above.

3. Select the best definition of an amateur radio operator.
- A. An amateur radio operator is any person who uses a radio for business.
 - B. An amateur radio operator is a telegraph operator.
 - C. An amateur radio operator is a person who operates a radio station.
 - D. An amateur radio operator is any person interested in radio techniques solely with a personal aim, and without any pecuniary (monetary) interest, holding a valid FCC license to operate amateur radio stations.
 - E. An amateur radio operator is any person interested in radio technique solely with a commercial aim, and without any pecuniary interest, holding a valid FCC license to operate amateur radio stations.
4. Select the best definition of an amateur radio station.
- A. An amateur radio station is any licensed radio station.
 - B. An amateur radio station is a station licensed in the amateur radio service embracing necessary apparatus at a particular location used for amateur radio station communications.
 - C. An amateur radio station is a station licensed in the amateur radio service embracing necessary apparatus at a particular location used for broadcasting communications.
 - D. An amateur radio station is a station that consists only of home-built equipment.
 - E. None of the above.
5. Select the best definition of a control operator.
- A. A control operator can only be the licensee of an amateur radio station.
 - B. A control operator can only be the licensee of an amateur radio station or some other operator designated by the licensee of the station to be responsible for the emissions from that station.
 - C. A control operator is any operator, other than the licensee, who uses an amateur radio station.
 - D. The control operator of an amateur radio station is a representative of the FCC.
 - E. A control operator is the person who owns the property where the amateur radio station is located.

6. Select the best definition of a station license.

- A. A station license is the instrument of authorization for a radio station in the amateur radio service.
- B. A station license is the instrument of authorization that includes only the location of a particular station.
- C. A station license is the instrument of authorization that includes only the call sign of the station.
- D. A station license is the instrument of authorization that includes only the class of operator privileges.
- E. None of the above.

7. Select the best definition of a primary station.

- A. A primary station is a station owned and operated by an extra class licensee.
- B. A primary station is any land based amateur radio station.
- C. A primary station is any amateur radio station that operates at full power.
- D. A primary station is the amateur radio station you operate the most.
- E. A primary station is the principal amateur radio station at a fixed land location shown on the station license.

8. Which of the following segments within the 80-meter band may a novice use?

- A. 7100 — 7150 kHz.
- B. 3700 — 3750 MHz.
- C. 3700 — 3750 kHz.
- D. 7.100 — 7.150 MHz.
- E. 7.100 — 7.150 kHz.

9. Which of the following segments within the 40-meter band is authorized for novice use?

- A. 28.1 — 28.2 MHz.
- B. 21.1 — 21.2 MHz.
- C. 7.1 — 7.15 kHz.
- D. 3.7 — 3.75 MHz.
- E. 7.1 — 7.15 MHz.

10. Which of the following segments within the 15-meter band may a novice use?

- A. 21,100 — 21,200 kHz.
- B. 21,100 — 21,200 MHz.
- C. 21.100 — 21.200 kHz.
- D. 21,000 — 21,100 kHz.
- E. None of the above.

11. Which of the following segments within the 10-meter band is authorized for novice use?

- A. 21,100 — 21,200 MHz.
- B. 21,100 — 21,200 kHz.
- C. 28,100 — 28,200 MHz.
- D. 28,100 — 28,200 kHz.
- E. 21.1 — 21.2 MHz.

12. What type of emission may a novice use?

- A. A1.
- B. A~~3~~.
- C. C1.
- D. F2.
- E. A3.

13. What is the maximum power a novice may use?

- A. 1000 watts output.
- B. 250 watts output.
- C. 75 watts input.
- D. 250 watts input.
- E. 100 watts input.

14. Which of the following is true concerning a novice license?

- A. License is good for two years, renewable.
- B. License is good for one year, non-renewable.
- C. License is good for one year, renewable.
- D. License is good for five years, renewable.
- E. License is good for two years, non-renewable.

15. What is the maximum height you could construct an antenna if you live two miles from an airport?
- A. 105.6 feet.
 - B. 10.56 feet.
 - C. 105 yards.
 - D. 1056 feet.
 - E. 200 feet.
16. Which of the following is responsible for the proper operation of an amateur radio station?
- A. The control operator(s) only.
 - B. The FCC.
 - C. The station licensee only.
 - D. The owner of the property where the station is located.
 - E. The station licensee and any control operators.
17. Which of the following is **not** a station identification requirement?
- A. You must identify your station at the beginning of a transmission or a series of transmissions.
 - B. You must identify the other station at the beginning of a series of transmissions.
 - C. You must identify your station at 10 minute intervals.
 - D. You must identify the other station at the end of a series of transmissions.
 - E. You must identify your station at the end of a transmission or series of transmissions.
18. Which of the following is **not** an authorized type of one-way transmission?
- A. Information bulletins having direct interest to other stations.
 - B. Code practice.
 - C. Emergency communications.
 - D. Broadcasting.
 - E. Testing.

19. Select the true statement concerning a novice license.
- A. The applicant cannot hold any amateur radio license or be a representative of a foreign government.
 - B. The applicant must also hold some other class of amateur radio license.
 - C. The applicant does not need to take the code or written tests if he has held an amateur radio license in the past.
 - D. The applicant must be at least 18 years old.
 - E. None of the above.
20. Which of the following may obtain an amateur radio **station** license?
- A. Only a representative of the FCC.
 - B. Any citizens band licensee.
 - C. A licensed amateur radio operator.
 - D. Only a first-class or second-class radiotelephone licensee.
 - E. Anyone who is a citizen of the United States.
21. Which of the following is the best definition of a log?
- A. A record of the station's activity.
 - B. A list of authorized operating frequencies.
 - C. A list of the station's equipment.
 - D. A list of authorized operators.
 - E. None of the above.
22. Which of the following is **not** required in a log?
- A. The fixed location of the station.
 - B. The call sign of each station worked.
 - C. The date when the station began operation.
 - D. The call sign of the station.
 - E. The signature of the station licensee.
23. How long must you retain your station log after the last entry?
- A. Five years.
 - B. Six months.
 - C. Two years.
 - D. Indefinitely.
 - E. One year.

24. Which of the following is an acceptable transmitter frequency-measuring device?
- A. A dip meter.
 - B. A frequency counter.
 - C. A heterodyne frequency meter.
 - D. A calibrated receiver.
 - E. All of the above.
25. Which of the following may an amateur radio station communicate with?
- A. Only amateur stations with the same class of license.
 - B. Any amateur radio station.
 - C. A citizens band station.
 - D. Only amateur operators with a higher class of license.
 - E. Only amateur stations in the United States.
26. How long do you have to answer a Notice of Violation?
- A. Ten hours.
 - B. Two weeks.
 - C. One month.
 - D. Ten days.
 - E. One day.
27. When may the FCC restrict the operation of an amateur radio station?
- A. Any time.
 - B. Only on weekends.
 - C. Only during the nighttime.
 - D. Only during the daytime.
 - E. Never.
28. Which of the following is prohibited?
- A. Unidentified communications.
 - B. Willful interference.
 - C. Broadcasting.
 - D. Transmission of obscenity, indecency, or profanity.
 - E. All of the above.

29. When is international third-party traffic allowed?
- A. It is always allowed.
 - B. It is not allowed unless both countries consent to it.
 - C. It is not allowed unless one of the countries consents to it.
 - D. It is never allowed.
 - E. It is only allowed for business purposes.
30. Which of the following is **not** considered when the FCC modifies a license?
- A. The length of time the station was licensed.
 - B. Convenience.
 - C. Public interest.
 - D. Necessity.
 - E. None of the above.
31. Which of the following must you have with you when you operate any amateur radio station?
- A. Your original operator's license.
 - B. A copy of your station license.
 - C. Either a copy or the original operator's license.
 - D. A copy of the operator's license.
 - E. The original station license.
32. Which of the following must be posted at your station when it is operated by another amateur in your absence?
- A. The original operator's license only.
 - B. The visiting amateur's station license.
 - C. Either the original or a copy of the station license.
 - D. A copy of the visitor's operator's license.
 - E. The original station license.

PRETEST ANSWERS

<u>Q</u>	<u>A</u>	<u>Frame No.</u>
1.	D	(1)
2.	C	(2)
3.	D	(4)
4.	B	(7)
5.	B	(10)
6.	A	(13)
7.	E	(16)
8.	C	(19)
9.	E	(22)
10.	A	(25)
11.	D	(28)
12.	A	(31)
13.	D	(34)
14.	■ D	(38)
15.	A	(41)
16.	E	(44)
17.	B	(47)
18.	D	(50)
19.	A	(53)
20.	C	(56)
21.	A	(59)
22.	B	(62)
23.	E	(65)
24.	E	(68)
25.	B	(71)
26.	D	(74)
27.	A	(77)
28.	E	(80)
29.	■	(83)
30.	A	(86)
31.	A	(89)
32.	C	(92)

INTRODUCTION

This module will teach you the basic rules and regulations that you must know before you operate an amateur radio transmitter. The main purpose of the rules and regulations is to prevent interference between different radio services and stations.

Several years ago, the International Telecommunication Union (ITU) was organized to help prevent interference between stations in different countries. This organization allocates blocks of frequencies to be used by the different services (broadcast, TV, amateur, etc.).

Most countries have their own governmental agency that controls radio transmitters within their boundaries. In the United States, the Communications Act of 1934 gives the Federal Communications Commission (FCC) the power to enact and enforce radio laws.

The radio laws, called the Rules and Regulations, are broken down into about 40 different groups. Each group, called a "Part," covers a different radio service. The Part which regulates the Amateur Radio Service is called Part 97. The basic regulations in Part 97 will be discussed in this module.

PROGRAMMED INSTRUCTION

1. Shortly after the advent of radio, many experimenters who were fascinated by the mystery of radio began building simple transmitters and receivers. By the early 1900's, there were hundreds of "amateurs" in the United States.

Amateur radio soon proved its usefulness by providing communications during emergencies, helping improve commercial communications through its experiments, and improving international friendships.

Although the amateur radio service has many purposes for its existence, the three main purposes are:

1. To provide a voluntary, non-commercial communication service for the public that is especially useful during an emergency.
2. To advance the state of the art.
3. To create a reservoir of trained radio operators and electronics experts.

The three main purposes for the existence of the amateur radio service are:

1. To _____ the state of the art.
2. To create a reservoir of _____ radio operators and _____ experts.
3. To provide a _____, non-_____ communication service for the public that is especially useful during an emergency.

advance, trained, electronics, voluntary, commercial

2. Amateur radio allows you to learn about electronics at your own speed and to whatever depth you desire. You will also be able to experiment with new circuits and ideas.

As a radio operator, you will be able to communicate with other radio operators both near and far. It is not uncommon for radio operators to talk to someone as far away as Japan, India, or even Russia.

The amateur radio service is a radio communication service of self-training, intercommunication, and technical investigation carried on by amateur radio operators.

The amateur radio service is a radio communication service of _____, _____, and _____ carried on by amateur radio operators.

self-training, intercommunication, technical investigation

3. Select the three main purposes for the existence of the amateur radio service.

- A. To advance the state of the art.
- B. To provide a voluntary, commercial communication service for the public that is especially useful during an emergency.
- C. To allow intercommunication for the enjoyment of individuals.
- D. To create a reservoir of trained radio operators and electronics experts.
- E. To provide a voluntary, non-commercial communication service for the public that is especially useful during an emergency.

A, D, and E

4. A person of any age or profession can become an amateur or "ham" radio operator. Boys and girls less than 10 years of age and men and women over 80 have become hams. As a ham, you may talk to a doctor, a student, or even the king of some far away country.

An amateur radio operator is any person interested in radio technique solely with a personal aim, and without pecuniary (monetary) interest, holding a valid Federal Communication Commission license to operate amateur radio stations.

An amateur radio operator is _____ interested in radio technique solely with a personal aim, and without any _____ interest, holding a valid FCC _____ to operate amateur radio stations.

any person, pecuniary, license

5. Select the best definition of the amateur radio service.
- A. The amateur radio service is a radio communication service of self-training, intercommunication, and non-technical investigation carried on by amateur radio operators.
 - B. The amateur radio service is a radio communication service of self-training, intercommunication, and technical investigation carried on by amateur radio operators.
 - C. The amateur radio service is a group of people interested in communicating with other people.
 - D. The amateur radio service is a radio communication service provided for business purposes.
 - E. None of the above.

B

6. Which of the following is **not** one of the three main purposes for the existence of the amateur radio service.
- A. To create a reservoir of trained radio operators and electronics experts.
 - B. To provide a voluntary non-commercial communication service for the public that is especially useful during an emergency.
 - C. To advance the state of the art.
 - D. To provide a voluntary, commercial communication service for the public that is especially useful during an emergency.
 - E. All of the above.

D

7. An amateur station consists of anything from a simple homemade transmitter and receiver to an elaborate transceiver with digital frequency display. Some ham stations have amateur television capability.

An amateur radio station is a station licensed in the amateur radio service embracing necessary apparatus at a particular location used for amateur radio communication.

An amateur radio station is a station _____ in the amateur radio service embracing necessary _____ at a particular location used for _____ communication.

licensed, apparatus, amateur radio

8. Select the best definition of an amateur radio operator.

- A. An amateur radio operator is any person interested in radio technique solely with a commercial aim, and without any pecuniary interest, holding a valid FCC license to operate amateur radio stations.
- B. An amateur radio operator is any person interested in radio technique solely with a personal aim, and without any pecuniary interest, holding a valid FCC license to operate amateur radio stations.
- C. An amateur radio operator is a person who operates any radio station.
- D. An amateur radio operator is any person who uses a radio for business.
- E. An amateur radio operator is a telegraph operator.

B

9. Select the best definition of the amateur radio service.

- A. The amateur radio service is a radio communication service of self-training, intercommunication, and non-technical investigation carried on by amateur radio operators.
- B. The amateur radio service is a group of people interested in communicating with other people.
- C. The amateur radio service is a radio communication service of self-training, intercommunication, and technical investigation carried on by amateur radio operators.
- D. The amateur radio service is a radio communication service provided for business purposes.
- E. None of the above.

C

10. The licensee of an amateur station is responsible for all operation from his station. If there are several operators using one station, such as a club station, all operators are responsible for the station's operation.

A control operator is the licensee of an amateur radio station or some other operator designated by the licensee of the station to be responsible for the emissions from that station.

A control operator is the _____ of an amateur radio station or some other _____ designated by the licensee of the station to be responsible for the emissions from that station.

licensee, operator

11. Select the best definition of an amateur radio station.

- A. An amateur radio station is a station licensed in the amateur radio service embracing necessary apparatus at a particular location used for amateur radio communications.
- B. An amateur radio station is a station licensed in the amateur radio service embracing necessary apparatus at a particular location used for broadcast communications.
- C. An amateur radio station is any licensed radio station.
- D. An amateur radio station is a station that consists only of home-built equipment.
- E. None of the above.

A

12. Select the best definition of an amateur radio operator.

- A. An amateur radio operator is any person who uses a radio for business.
- B. An amateur radio operator is a telegraph operator.
- C. An amateur radio operator is a person who operates a radio station.
- D. An amateur radio operator is any person interested in radio technique solely with a personal aim, and without any pecuniary interest, holding a valid FCC license to operate amateur radio stations.
- E. An amateur radio operator is any person interested in radio technique solely with a commercial aim, and without any pecuniary interest, holding a valid FCC license to operate amateur radio stations.

D

13. A station license is required before you can operate an amateur radio station from a given location. The station license is actually on the same piece of paper as the operator license.

The station license is the instrument of authorization for a radio station in the amateur radio service.

The station license is the _____ of _____ for a radio station in the amateur radio service.

instrument, authorization.

14. Select the best definition of a control operator.

- A. The control operator is the licensee of an amateur radio station or some other operator designated by the licensee of the station to be responsible for the emissions from that station.
- B. A control operator can only be the licensee of an amateur radio station.
- C. A representative from the FCC is the control operator of an amateur station.
- D. A control operator is any operator, other than the licensee, who uses an amateur radio station.
- E. The control operator is the person who owns the property where the equipment is located.

A

15. Select the best definition of an amateur radio station.

- A. An amateur radio station is any licensed radio station.
- B. An amateur radio station is a station licensed in the amateur radio service embracing necessary apparatus at a particular location used for amateur radio communications.
- C. An amateur radio station is a station licensed in the amateur radio service embracing necessary apparatus at a particular location used for broadcast communications.
- D. An amateur radio station is a station that consists only of home-built equipment.
- E. None of the above.

B

16. As an amateur radio operator, you may have as many stations as you wish. You could, for example, install a station in your home, your car, or even carry one with you.

A primary station is the principal amateur radio station at a specific land location shown on the station license.

A primary station is the _____ amateur radio station at a specific _____ location shown on the _____ license.

principal, land, station

17. Select the best definition of a station license.

- A. A station license is the instrument of authorization that includes only the class of operator privileges.
- B. A station license is the instrument of authorization that includes only the call sign of the station.
- C. A station license is the instrument of authorization for a radio station in the amateur radio service.
- D. A station license is the instrument of authorization that includes only the location of a particular station.
- E. None of the above.

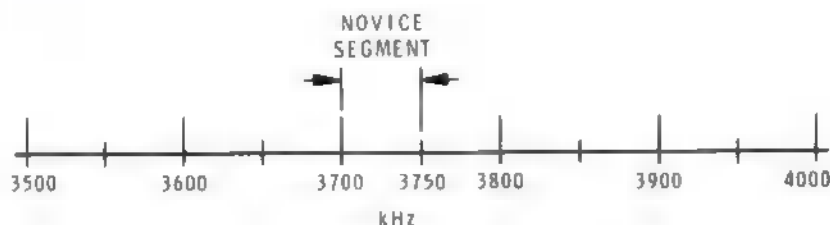
C

18. Select the best definition of a control operator.

- A. A control operator can only be the licensee of an amateur radio station.
- B. The control operator is the licensee of an amateur radio station or some other operator designated by the licensee of the station to be responsible for the emissions from that station.
- C. A control operator is any operator, other than the licensee, who uses an amateur radio station.
- D. The control operator of an amateur radio station is a representative of the FCC.
- E. A control operator is the person who owns the property where the amateur radio station is located.

B

19. The frequency band between 3500 and 4000 kHz (or 3.500 to 4.000 MHz) is referred to as the 80-meter amateur band.



80-METER AMATEUR BAND

On the 80-meter band, a novice may operate between 3700 and 3750 kHz (or 3.700 and 3.750 MHz).

A novice may operate between _____ and _____ kHz on the 80-meter band.

3700, 3750

20. Select the best definition of a primary station.

- A. A primary station is the amateur radio station you operate the most.
- B. A primary station is the amateur radio station that operates at full power.
- C. A primary station is the principal amateur radio station at a specific land location shown on the station license.
- D. A primary station is any land-based station.
- E. A primary station is any station owned and operated by an extra-class licensee.

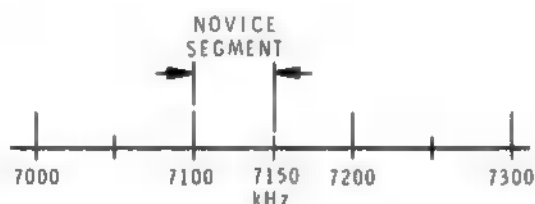
C

21. Select the best definition of a station license.

- A. A station license is the instrument of authorization for a radio station in the amateur radio service.
- B. A station license is the instrument of authorization that includes only the location of a particular station.
- C. A station license is the instrument of authorization that includes only the call sign of the station.
- D. A station license is the instrument of authorization that includes only the class of operator privileges.
- E. None of the above.

A

22. The frequency band between 7000 and 7300 kHz (7.000 and 7.300 MHz) is called the 40-meter amateur band.



40-METER AMATEUR BAND

On the 40-meter band, a novice may operate between 7100 and 7150 kHz (7.100 and 7.150 MHz).

A novice may operate between _____ and _____ kHz on the 40-meter band.

7100, 7150

23. Select the frequencies within the 80-meter amateur band where a novice may operate.

- A. 3750 — 3800 kHz.
- B. 7100 — 7150 kHz.
- C. 7.1 — 7.15 MHz.
- D. 3.7 — 3.75 MHz.
- E. None of the above.

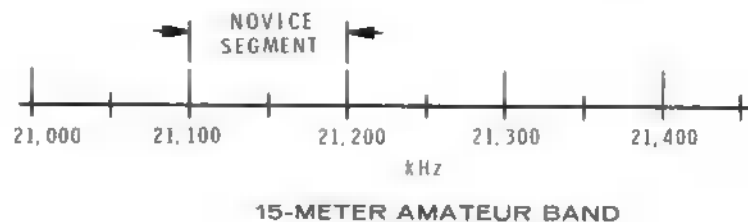
D

24. Select the best definition of a primary station.

- A. A primary station is a station owned and operated by an extra-class licensee.
- B. A primary station is any land-based amateur radio station.
- C. A primary station is any amateur radio station that operates at full power.
- D. A primary station is the amateur radio station you operate the most.
- E. A primary station is the principal amateur radio station at a fixed land location shown on the station license.

E

25. The frequency band between 21,000 and 21,450 kHz (21.000 and 21.450 MHz) is called the 15-meter band.



On the 15-meter band, a novice may operate between 21,100 and 21,200 kHz (21.100 and 21.200 MHz).

A novice may operate between _____ and _____ kHz on the 15-meter band.

21,100 and 21,200

26. Select the frequencies within the 40-meter amateur band where a novice may operate.

- A. 7100 — 7150 kHz.
- B. 7150 — 7200 kHz.
- C. 7050 — 7100 kHz.
- D. 3700 — 3750 kHz.
- E. 3.700 — 3.750 MHz.

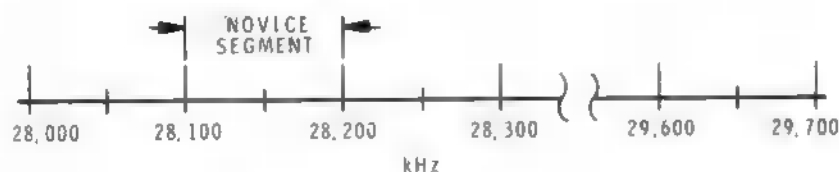
A

27. Select the frequencies within the 80-meter amateur band where a novice may operate.

- A. 7100 — 7150 kHz.
- B. 3700 — 3750 MHz.
- C. 3700 — 3750 kHz.
- D. 7.100 — 7.150 MHz.
- E. 7.100 — 7.150 kHz.

C

28. The frequency band between 28,000 and 29,700 kHz (28.000 and 29.700 MHz) is called the 10-meter amateur band (see Figure 1-4).



10-METER AMATEUR BAND

On the 10-meter band, a novice may operate between 28,100 and 28,200 kHz (28.100 and 28.200 MHz).

A novice may operate between _____ and _____ kHz on the 10-meter band.

28,100 and 28,200

29. Select the frequencies within the 15-meter amateur band where a novice may operate.

- A. 7100 — 7150 kHz.
- B. 3.7 — 3.75 MHz.
- C. 21.1 — 21.2 MHz.
- D. 21,150 — 21,250 kHz.
- E. 21.1 — 21.2 kHz.

C

30. Select the frequencies within the 40-meter amateur band where a novice may operate.

- A. 28.1 — 28.2 MHz.
- B. 21.1 — 21.2 MHz.
- C. 7.1 — 7.15 kHz.
- D. 3.7 — 3.75 MHz.
- E. 7.1 — 7.15 MHz.

E

31. There are several different types of emission that amateur radio operators are permitted to use.

A novice may use only type A1 emission.

Type A1 emission means telegraphy (International Morse Code) on pure continuous waves. This is commonly referred to by amateur radio operators as "CW," which is the abbreviation for continuous wave.

A novice may use only type _____ emission.

A1

32. Select the frequencies within the 10-meter amateur band where a novice may operate.

- A. 3700 — 3750 kHz.
- B. 28.1 — 28.2 MHz.
- C. 28.200 — 28.300 MHz.
- D. 7100 — 7150 kHz.
- E. 21.100 — 21.200 MHz.

B

33. Select the frequencies within the 15-meter amateur band where a novice may operate.

- A. 21,100 — 21,200 kHz.
- B. 21,100 — 21,200 MHz.
- C. 21.100 — 21.200 kHz.
- D. 21,000 — 21,100 kHz.
- E. None of the above.

A

34. All amateur radio operators have a maximum permitted transmitter power level. This power is measured at the **input** to the transmitter final amplifier stage that supplies RF (radio frequency) energy to the antenna. This power does not include the power used to heat the cathodes of the vacuum tubes (on transmitters that have tubes).

The maximum transmitter power a novice may use is 250 watts input.

No matter how much maximum power your license allows you to use, the FCC requires that you use the **minimum** amount of power necessary to communicate with a given station.

A novice may use a maximum of _____ watts input.

250

35. Select the type of emission that a novice may use.

- A. $A\phi$.
- B. A1.
- C. A2.
- D. A3.
- E. F1.

B

36. Select the frequencies within the 10-meter amateur band where a novice may operate.

- A. 21,100 — 21,200 MHz.
- B. 21,100 — 21,200 kHz.
- C. 28,100 — 28,200 MHz.
- D. 28,100 — 28,200 kHz.
- E. 21.1 — 21.2 MHz.

D

37. Select the band or bands where a novice may operate.

- A. 3700 — 3750 kHz.
- B. 7100 — 7150 kHz.
- C. 21.1 — 21.2 MHz.
- D. 28.1 — 28.2 MHz.
- E. All of the above.

E

38. All classes of amateur radio licenses, except novice, are good for five years and are renewable.

The novice class license is only good for **5 YEARS** and is **renewable**.

When the novice license expires, you may take the test over again and obtain a new novice license, which is good for another two years.

The novice class license is good for _____ years and is _____ renewable.

two, not

39. Select the maximum transmitter power a novice may use.

- A. 1000 watts output.
- B. 1000 watts input.
- C. 250 watts output.
- D. 250 watts input.
- E. 100 watts input.

D

40. Select the type of emission a novice may use.

- A. A1.
- B. AØ.
- C. F1.
- D. F2.
- E. A3.

A

41. Most amateur radio operators have antennas less than 200 feet above ground and are not affected by the Rules and Regulations concerning antenna structure.

An antenna structure may be one foot above ground for each 100 feet the structure is from the nearest boundary of an airport.

You may exceed the restrictions in the above statement if the structure is less than 20 feet above another existing structure such as a tree, building, etc.

How high may you construct an antenna if you live 2 miles from an airport?

SOLUTION:

$$2 \text{ miles} = 10,560 \text{ feet } (5,280 \text{ feet/mile} \times 2)$$

$$10,560 \div 100 = 105.6 \text{ feet (answer)}$$

How high may you construct an antenna if you live 3 miles from an airport? _____

$$158.4 \text{ feet } \left(\frac{5,280 \text{ feet} \times 3 \text{ miles}}{100} = 158.4 \text{ feet} \right)$$

42. Which of the following is true concerning a novice license?

- A. License is good for 2 years, renewable.
- B. License is good for one year, non-renewable.
- C. License is good for one year, renewable.
- D. License is good for five years, renewable.
- E. License is good for two years, non-renewable.

43. Select the maximum transmitter power a novice is permitted to use.

- A. 1000 watts output.
- B. 250 watts output.
- C. 1000 watts input.
- D. 250 watts input.
- E. 100 watts input.

D

44. An amateur station may be operated by the station licensee designated by the station license.

The station licensee and each control operator, if any, is responsible for proper operation of an amateur radio station.

The station _____ and each _____, if any, is responsible for the proper operation of an amateur radio station.

licensee, control operator

45. What is the maximum height above ground you may construct an antenna structure if you live one mile from an airport?

- A. 105 feet.
- B. 52.8 feet.
- C. 200 feet.
- D. 52 yards.
- E. None of the above.

B (5,280 feet/mile divided by 100)

46. Which of the following is the correct term of a novice license?

- A. License is good for five years, renewable.
- B. License is good for one year, renewable.
- C. License is good for two years, non-renewable.
- D. License is good for one year, non-renewable.
- E. License is good for two years, renewable.

■ A

47. Every amateur radio operator in the world is assigned call letters by his government. The first part of the call letters, usually one or two letters, indicate which country the station is licensed in. The number after the first letter(s) indicate a smaller area within that country. For example, in the call sign K8XYZ, the K indicates the station is in the United States and the 8 indicates it is in Michigan, Ohio, or West Virginia. The rest of the call sign (XYZ) is assigned randomly.

You must identify your station at the beginning and end of a transmission, or series of transmissions, and at intervals not to exceed 10 minutes.

In addition to identifying your station, you must identify the stations (if more than one), with whom you are talking at the end of a transmission or series of transmissions.

You must identify your station at the _____ and _____ of a transmission, or series of transmissions, and at intervals not to exceed _____ minutes.

beginning, end, 10

48. Which of the following is responsible for the proper operation of an amateur radio station?

- A. The station licensee only.
- B. The station licensee and any control operators.
- C. The station control operators only.
- D. The FCC.
- E. The owner of the property where the station is located.

B

49. Select the maximum height you may construct an antenna structure if you live 2-1/2 miles from an airport.

- A. 132 feet.
- B. 13.2 feet.
- C. 132 yards.
- D. 52 feet.
- E. 200 feet.

A ($\frac{5,280 \text{ feet} \times 2.5 \text{ miles}}{100} = 132$)

50. An amateur radio station may transmit one-way signals for testing, emergency communications (including drill practice), information bulletins having direct interest to amateur radio operators, round table (group) discussions, and code practice.

An amateur radio station may not be used for any form of broadcasting either directly or indirectly, to the public.

An amateur radio station may not be used for any form of _____, either directly or indirectly, to the public.

broadcasting

51. Which of the following is not a station identification requirement:

- A. You must identify your station at the beginning of a transmission or series of transmissions.
- B. You must identify your station at the end of a transmission or series of transmissions.
- C. You must identify your station at 10-minute intervals.
- D. You must identify the other station at the end of a series of transmissions.
- E. You must identify the other station at the beginning of a series of transmissions.

E

52. Which of the following is responsible for the proper operation of an amateur radio station?

- A. The control operator(s) only.
- B. The FCC.
- C. The station licensee only.
- D. The owner of the property where the station is located.
- E. The station licensee and any control operators.

E

53. Anyone who does not hold an amateur radio license and is not a representative of a foreign government is eligible for a novice license.

Until recently, you had to wait a year after the expiration of a novice license before you could reapply for a new novice license. Now, you can reapply for a novice license as soon as it expires, but you must pass the code and written tests again.

Anyone who does not hold an _____ radio license and is not a representative of a _____ government is eligible for a novice license.

amateur, foreign

54. Which of the following is **not** an authorized type of one-way transmission?

- A. Information bulletins having direct interest to other amateurs.
- B. Code practice.
- C. Emergency communications.
- D. Broadcasting.
- E. Testing.

D

55. Which of the following is a station identification requirement?

- A. You must identify your station at the beginning of a transmission or series of transmissions.
- B. You must identify your station at the end of a transmission or series of transmissions.
- C. You must identify your station at 10-minute intervals.
- D. You must identify the other station at the end of a transmission or series of transmissions.
- E. All of the above.

E

56. **Except for a military amateur station license, only a licensed amateur radio operator can obtain an amateur radio station license.**

In most cases, both the station license and the operator license are printed on the same form. The station license authorizes the installation of a station at a given location. An operator license authorizes an individual to operate an amateur radio station.

Except for a military amateur station license, only a _____ amateur radio _____ can obtain an amateur radio station license.

licensed, operator

57. Which of the following is a true statement concerning a novice license?

- A. The applicant must be at least 18 years old.
- B. The applicant must hold some other class of amateur radio license.
- C. The applicant does not need to take the code and written tests if he has successfully passed them at some earlier date.
- D. The applicant cannot hold any amateur radio license or be a representative of a foreign government.
- E. None of the above.

D

58. Which of the following is **not** an authorized type of one-way transmission?

- A. Information bulletins having direct interest to other amateurs.
- B. Broadcasting.
- C. Emergency communications.
- D. Testing.
- E. Code practice.

B

59. Many amateur radio operators keep very complete written notes on all transmissions they make from their stations.

A written record of an amateur radio station's activity is called a log.

A written record of an amateur radio station's activity is called a _____.

log

60. Who may obtain an amateur radio **station** license?

- A. Anyone who is a citizen of the United States.
- B. A licensed amateur radio operator.
- C. An unlicensed amateur radio operator.
- D. Any citizens band licensee.
- E. Only a person designated by the FCC.

B

61. Select the true statement concerning a novice license.

- A. The applicant cannot hold any amateur radio license or be a representative of a foreign government.
- B. The applicant must also hold some other class of amateur radio license.
- C. The applicant does not need to take the code or written tests if he has held an amateur radio license in the past.
- D. The applicant must be at least 18 years old.
- E. None of the above.

A

- 62.** Until recently, the FCC required an amateur operator to keep complete up-to-date logs of his station activities. In 1974 the logging requirements were significantly reduced to the minimum we now have.

The minimum contents required in a log are:

- 1. The station call letters and the signature of the station licensee (or a photocopy of the station license).**
- 2. The locations and dates upon which fixed operation of the station was initiated and terminated.**
- 3. The primary call sign of any control operator and the dates and times he operated the station.**

In addition to the above required log contents, the FCC may require other information in a particular station's log.

The minimum contents required in a log are:

- 1. The station _____ and the _____ of the station licensee.**
- 2. The locations and dates when fixed operation was _____ and _____.**
- 3. The primary _____ of any control operator and the dates and times he operated the station.**

1. call letters, signature
2. initiated, terminated
3. call letters

63. Which of the following best describes an amateur radio station log?

- A. A list of authorized operators.
- B. A list of the station's equipment.
- C. A list of the authorized operating frequencies.
- D. A record of the station's activity.
- E. None of the above.

D

64. Which of the following may obtain an amateur radio station license?

- A. Only a representative of the FCC.
- B. Any citizens band licensee.
- C. A licensed amateur radio operator.
- D. Only a first-class or second-class radiotelephone licensee.
- E. Anyone who is a citizen of the United States.

C

65. A station log must be kept for at least one year after the date of the last entry.

A station log must be kept for at least _____ after the date of the last entry.

one year

66. Which of the following is **not** required in a log?

- A. The call sign of the station.
- B. The signature of the station licensee.
- C. The fixed location of the station.
- D. The date when the station began operation.
- E. The frequency of each operation.

E

67. Select the best definition of a station log.

- A. A record of the station's activity.
- B. A list of authorized operating frequencies.
- C. A list of the station's equipment.
- D. A list of the authorized operators.
- E. None of the above.

A

68. The FCC requires you to make regular checks of your transmitter frequency. This will ensure you that your transmitter dial is calibrated accurately and you will be operating in the proper amateur band. The method you use must be independent of the means used to control the transmitter frequency. This means, you cannot simply read the dial on your transmitter.

Some acceptable frequency-measuring devices are: a frequency counter, a calibrated receiver, a heterodyne frequency meter, or a dip meter.

Four acceptable frequency-measuring devices are: a _____, a _____, a _____, or a _____.

frequency counter, calibrated receiver, heterodyne frequency meter, dip meter.

69. How long must you retain your log after the last entry?

- A. One year.
- B. Two years.
- C. Five years.
- D. Indefinitely.
- E. Six months.

A

70. Which of the following is **not** required in a log?

- A. The fixed location of the station.
- B. The call sign of each station worked.
- C. The date when the station began operation.
- D. The call sign of the station.
- E. The signature of the station licensee.

B

71. **An amateur radio station may communicate with other amateur stations or any station authorized by the FCC to communicate with amateurs.**

An amateur radio station may communicate with other _____ or any _____ authorized by the FCC to communicate with amateurs.

amateur stations, station

72. Which of the following is **not** an acceptable transmitter frequency-measuring device?

- A. A heterodyne frequency meter.
- B. A calibrated receiver.
- C. A frequency counter.
- D. The transmitter tuning dial.
- E. A dip meter.

D

73. How long must you retain your station log after the last entry?

- A. Five years.
- B. Six months.
- C. Two years.
- D. Indefinitely.
- E. One year.

E

74. Although most amateurs strive to operate within the Rules and Regulations, occasionally a rule is accidentally broken. If one of the FCC's monitoring stations hears a violation, they may send the station at fault a Notice of Violation. Usually all that is required is a prompt reply stating you will take action to prevent a recurrence.

You must reply to a Notice of Violation within 10 days.

The worst thing you can do is ignore a Notice of Violation. The FCC could suspend or revoke your license or even levy a fine.

You must reply to a Notice of Violation within _____ days.

75. Which of the following is an amateur radio operator authorized to communicate with?

- A. A citizens band station.
- B. Only amateur stations with the same class of license.
- C. Any amateur radio station.
- D. Only amateur operators with a higher class of license.
- E. Only amateur stations in the United States.

C

76. Which of the following is an acceptable transmitter frequency-measuring device.

- A. A dip meter.
- B. A frequency counter.
- C. A heterodyne frequency meter.
- D. A calibrated receiver.
- E. All of the above.

E

77. Amateur radio operators may operate their stations at any time they desire and are not bound to any schedules.

The FCC may restrict the operation of a particular station at any time.

Usually the FCC restricts stations only when there is interference with broadcast services or when an operator fails to answer a Notice of Violation.

The FCC may restrict the operation of a station at _____.

any time

78. How much time do you have to answer a Notice of Violation?

- A. Ten days
- B. Ten hours
- C. Two weeks.
- D. One month.
- E. One day.

A

79. Which of the following may an amateur radio station communicate with?

- A. Only amateur stations with the same class of license.
- B. Any amateur radio station.
- C. A citizens band station.
- D. Only amateur operators with a higher class of license.
- E. Only amateur stations in the United States.

B

80. Although there are very few restrictions as to what an amateur may talk about on his radio, there are a few things that are not permitted.

An amateur radio operator may not engage in broadcasting, unidentified communications, or willful interference. Also, he cannot transmit obscenity, indecency, or profanity.

An amateur radio operator may not engage in _____,
_____, or _____.
Also, he cannot transmit _____,
_____, or _____.

broadcasting, unidentified communications, willful interference,
obscenity, indecency, profanity.

81. When may the FCC restrict the operation of an amateur radio station?

- A. Only during the daytime.
- B. Only during the nighttime.
- C. Only on weekends.
- D. Any time.
- E. Never.

D

82. How much time do you have to answer a Notice of Violation?

- A. Ten hours.
- B. Two weeks.
- C. One month.
- D. Ten days.
- E. One day.

D

83. If an amateur radio operator provides communications or sends a message for another person, this is called "third party traffic."

International third party traffic is not allowed unless the two countries involved consent to it.

Any third party traffic that involves any kind of material compensation (payment) is prohibited.

International third party traffic is _____ unless
(allowed/not allowed)
the two countries involved consent to it.

not allowed

84. Which of the following is prohibited?

- A. Broadcasting.
- B. Unidentified communications.
- C. Willful interference.
- D. Transmission of obscenity, indecency, or profanity.
- E. All of the above.

E

85. When may the FCC restrict the operation of an amateur radio station?

- A. Any time.
- B. Only on weekends.
- C. Only during the nighttime.
- D. Only during the daytime.
- E. Never.

A

86. The FCC may modify a station license any time it determines that public interest, convenience, and necessity would be served.

Before the FCC modifies a station license, it orders the licensee to show cause why the station license should not be modified.

The FCC may modify a station license any time it determines that _____, _____, or _____ would be served.

public interest, convenience, necessity.

87. International third party traffic is

- A. Never allowed.
- B. Not allowed unless one of the countries consents to it.
- C. Not allowed unless both countries consent to it.
- D. Always allowed.
- E. None of the above.

C

88. Which of the following is prohibited?

- A. Unidentified communications.
- B. Willful interference.
- C. Broadcasting.
- D. Transmission of obscenity, indecency, or profanity.
- E. All of the above.

E

89. A licensed radio amateur may operate his own station or the station of another amateur.

You must always have your original operator's license with you any time you operate an amateur station.

If you only operate your own station you may post your license at your station. If, however, you operate the station of a friend, you must have your original license with you.

You must always have your _____ operator's license with you any time you operate an amateur station.

original

90. Which of the following is **not** considered when the FCC modifies a station license?

- A. Necessity.
- B. The length of time the station was licensed.
- C. Public interest.
- D. Convenience.
- E. None of the above.

B

91. International third party traffic is

- A. Always allowed.
- B. Not allowed unless both countries consent to it.
- C. Not allowed unless one of the countries consents to it.
- D. Never allowed.
- E. Only allowed for business purposes.

B

92. As explained earlier, you must have your original operator's license with you any time you operate an amateur station. This is not true in the case of the station license.

It is only necessary to post a copy of the station license at your station.

If you are the only person that operates your station, and since the operator's license and the station license is really the same piece of paper, all you need is the original license. If, however, another amateur radio operator uses your station in your absence, a copy of the station license (or the original) must be present.

It is only necessary to post _____ of the station license at your station.

a copy

93. Which of the following must you have with you when you operate any amateur radio station?

- A. A copy of your station license.
- B. Either a copy or the original operators license.
- C. A copy of the operator's license.
- D. Your original operator's license.
- E. The original station license.

D

94. Which of the following is **not** considered when the FCC modifies a license?

- A. The length of time the station was licensed.
- B. Convenience.
- C. Public interest.
- D. Necessity.
- E. None of the above.

A

95. Which of the following must be posted at your station when it is operated by another amateur in your absence?

- A. The original station license only.
- B. A copy of the visitor's operator's license.
- C. Either the original or a copy of the station license.
- D. The visiting amateur's station license.
- E. The original operator's license.

C

96. Which of the following must you have with you when you operate any amateur radio station?

- A. Your original operator's license.
- B. A copy of your station license.
- C. Either a copy or the original operator's license.
- D. A copy of the operator's license.
- E. The original station license.

A

97. Which of the following must be posted at your station when it is operated by another amateur in your absence?

- A. The original operator's license only.
- B. The visiting amateur's station license.
- C. Either the original or a copy of the station license.
- D. A copy of the visitor's operator's license.
- E. The original station license.

C

MODULE EXAMINATION

This examination will test your knowledge of the material presented in this module. For each question, circle the multiple choice answer (A, B, C, D, or E) you feel is most correct. When you have completed these questions, compare your answers with the correct ones that appear under "Examination Answers," which follows.

- If you miss more than six questions, go back and re-read this whole module.
 - If you have less than six incorrect answers, go back and study those frames pertaining to the questions you missed (the number in parentheses, following the correct answer, refers you to the proper frame). Then proceed to the next module.
1. Which of the following is **not** one of the main purposes for the existence of the amateur radio service?
 - A. To create a reservoir of trained radio operators and electronics experts.
 - B. To provide a voluntary, non-commercial communication service for the public that is especially useful during an emergency.
 - C. To advance the state of the art.
 - D. To provide a voluntary, commercial communication service for the public that is especially useful during an emergency.
 - E. All of the above.
 2. Select the best definition of the amateur radio service.
 - A. The amateur radio service is a radio communication service of self-training, intercommunication, and non-technical investigation carried on by amateur radio operators.
 - B. The amateur radio service is a group of people interested in communicating with other people.
 - C. The amateur radio service is a radio communication service of self-training, intercommunication, and technical investigation carried on by amateur radio operators.
 - D. The amateur radio service is a radio communication service provided for business purposes.
 - E. None of the above.

3. Select the best definition of an amateur radio operator.
- A. An amateur radio operator is any person who uses a radio for business.
 - B. An amateur radio operator is a telegraph operator.
 - C. An amateur radio operator is a person who operates a radio station.
 - D. An amateur radio operator is any person interested in radio techniques solely with a personal aim, and without any pecuniary (monetary) interest, holding a valid FCC license to operate amateur radio stations.
 - E. An amateur radio operator is any person interested in radio technique solely with a commercial aim, and without any pecuniary interest, holding a valid FCC license to operate amateur radio stations.
4. Select the best definition of an amateur radio station.
- A. An amateur radio station is any licensed radio station.
 - B. An amateur radio station is a station licensed in the amateur radio service embracing necessary apparatus at a particular location used for amateur radio station communications.
 - C. An amateur radio station is a station licensed in the amateur radio service embracing necessary apparatus at a particular location used for broadcasting communications.
 - D. An amateur radio station is a station that consists only of home-built equipment.
 - E. None of the above.
5. Select the best definition of a control operator.
- A. A control operator can only be the licensee of an amateur radio station.
 - B. A control operator can only be the licensee of an amateur radio station or some other operator designated by the licensee of the station to be responsible for the emissions from that station.
 - C. A control operator is any operator, other than the licensee, who uses an amateur radio station.
 - D. The control operator of an amateur radio station is a representative of the FCC.
 - E. A control operator is the person who owns the property where the amateur radio station is located.

6. Select the best definition of a station license.
- A. A station license is the instrument of authorization for a radio station in the amateur radio service.
 - B. A station license is the instrument of authorization that includes only the location of a particular station.
 - C. A station license is the instrument of authorization that includes only the call sign of the station.
 - D. A station license is the instrument of authorization that includes only the class of operator privileges.
 - E. None of the above.
7. Select the best definition of a primary station.
- A. A primary station is a station owned and operated by an extra-class licensee.
 - B. A primary station is any land-based amateur radio station.
 - C. A primary station is any amateur radio station that operates at full power.
 - D. A primary station is the amateur radio station you operate the most.
 - E. A primary station is the principal amateur radio station at a fixed land location shown on the station license.
8. Which of the following segments within the 80-meter band may a novice use?
- A. 7100 — 7150 kHz.
 - B. 3700 — 3750 MHz.
 - C. 3700 — 3750 kHz.
 - D. 7.100 — 7.150 MHz.
 - E. 7.100 — 7.150 kHz.
9. Which of the following segments within the 40-meter band is authorized for novice use?
- A. 28.1 — 28.2 MHz.
 - B. 21.1 — 21.2 MHz.
 - C. 7.1 — 7.15 kHz.
 - D. 3.7 — 3.75 MHz.
 - E. 7.1 — 7.15 MHz.

10. Which of the following segments within the 15-meter band may a novice use?
- A. 21,100 — 21,200 kHz.
 - B. 21,100 — 21,200 MHz.
 - C. 21.100 — 21.200 kHz.
 - D. 21,000 — 21,100 kHz.
 - E. None of the above.
11. Which of the following segments within the 10-meter band is authorized for novice use?
- A. 21,100 — 21,200 MHz.
 - B. 21,100 — 21,200 kHz.
 - C. 28,100 — 28,200 MHz.
 - D. 28,100 — 28,200 kHz.
 - E. 21.1 — 21.2 MHz.
12. What type of emission may a novice use?
- A. A1.
 - B. A ϕ .
 - C. C1.
 - D. F2.
 - E. A3.
13. What is the maximum power a novice may use?
- A. 1000 watts output.
 - B. 250 watts output.
 - C. 75 watts input.
 - D. 250 watts input.
 - E. 100 watts input.
14. Which of the following is true concerning a novice license?
- A. License is good for two years, renewable.
 - B. License is good for one year, non-renewable.
 - C. License is good for one year, renewable.
 - D. License is good for five years, renewable.
 - E. License is good for two years, non-renewable.

15. What is the maximum height you could construct an antenna if you live two miles from an airport?
- A. 105.6 feet.
 - B. 10.56 feet.
 - C. 105 yards.
 - D. 1056 feet.
 - E. 200 feet.
16. Which of the following is responsible for the proper operation of an amateur radio station?
- A. The control operator(s) only.
 - B. The FCC.
 - C. The station licensee only.
 - D. The owner of the property where the station is located.
 - E. The station licensee and any control operators.
17. Which of the following is **not** a station identification requirement?
- A. You must identify your station at the beginning of a transmission or a series of transmissions.
 - B. You must identify the other station at the beginning of a series of transmissions.
 - C. You must identify your station at 10 minute intervals.
 - D. You must identify the other station at the end of a series of transmissions.
 - E. You must identify your station at the end of a transmission or series of transmissions.
18. Which of the following is **not** an authorized type of one-way transmission?
- A. Information bulletins having direct interest to other stations.
 - B. Code practice.
 - C. Emergency communications.
 - D. Broadcasting.
 - E. Testing.

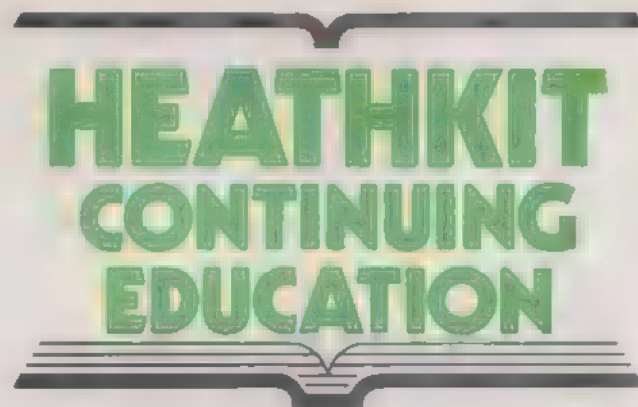
19. Select the true statement concerning a novice license.
- A. The applicant cannot hold any amateur radio license or be a representative of a foreign government.
 - B. The applicant must also hold some other class of amateur radio license.
 - C. The applicant does not need to take the code or written tests if he has held an amateur radio license in the past.
 - D. The applicant must be at least 18 years old.
 - E. None of the above.
20. Which of the following may obtain an amateur radio station license?
- A. Only a representative of the FCC.
 - B. Any citizens band licensee.
 - C. A licensed amateur radio operator.
 - D. Only a first-class or second-class radiotelephone licensee.
 - E. Anyone who is a citizen of the United States.
21. Which of the following is the best definition of a log?
- A. A record of the station's activity.
 - B. A list of authorized operating frequencies.
 - C. A list of the station's equipment.
 - D. A list of authorized operators.
 - E. None of the above.
22. Which of the following is **not** required in a log?
- A. The fixed location of the station.
 - B. The call sign of each station worked.
 - C. The date when the station began operation.
 - D. The call sign of the station.
 - E. The signature of the station licensee.
23. How long must you retain your station log after the last entry?
- A. Five years.
 - B. Six months.
 - C. Two years.
 - D. Indefinitely.
 - E. One year.

24. Which of the following is an acceptable transmitter frequency-measuring device?
- A. A dip meter.
 - B. A frequency counter.
 - C. A heterodyne frequency meter.
 - D. A calibrated receiver.
 - E. All of the above.
25. Which of the following may an amateur radio station communicate with?
- A. Only amateur stations with the same class license.
 - B. Any amateur radio station.
 - C. A citizens band station.
 - D. Only amateur operators with a higher class of license.
 - E. Only amateur stations in the United States.
26. How much time do you have to answer a Notice of Violation?
- A. Ten hours.
 - B. Two weeks.
 - C. One month.
 - D. Ten days.
 - E. One day.
27. When may the FCC restrict the operation of an amateur radio station?
- A. Any time.
 - B. Only on weekends.
 - C. Only during the nighttime.
 - D. Only during the daytime.
 - E. Never.
28. Which of the following is prohibited?
- A. Unidentified communications.
 - B. Willful interference.
 - C. Broadcasting.
 - D. Transmission of obscenity, indecency, or profanity.
 - E. All of the above.

29. When is international third-party traffic allowed?
- A. It is always allowed.
 - B. It is not allowed unless both countries consent to it.
 - C. It is not allowed unless one of the countries consents to it.
 - D. It is never allowed.
 - E. It is only allowed for business purposes.
30. Which of the following is **not** considered when the FCC modifies a license?
- A. The length of time the station was licensed.
 - B. Convenience.
 - C. Public interest.
 - D. Necessity.
 - E. None of the above.
31. Which of the following must you have with you when you operate any amateur radio station?
- A. Your original operator's license.
 - B. A copy of your station license.
 - C. Either a copy or the original operator's license.
 - D. A copy of the operator's license.
 - E. The original station license.
32. Which of the following must be posted at your station when it is operated by another amateur in your absence?
- A. The original operator's license only.
 - B. The visiting amateur's station license.
 - C. Either the original or a copy of the station license.
 - D. A copy of the visitor's operator's license.
 - E. The original station license.

EXAMINATION ANSWERS

<u>Q</u>	<u>A</u>	<u>Frame No.</u>
1.	D	(1)
2.	C	(2)
3.	D	(4)
4.	■	(7)
5.	■	(10)
6.	A	(13)
7.	E	(16)
8.	C	(19)
9.	E	(22)
10.	A	(25)
11.	D	(28)
12.	A	(31)
13.	D	(34)
14.	■ D	(38)
15.	A	(41)
16.	E	(44)
17.	B	(47)
18.	D	(50)
19.	A	(53)
20.	C	(56)
21.	A	(59)
22.	B	(62)
23.	E	(65)
24.	E	(68)
25.	■	(71)
26.	D	(74)
27.	A	(77)
28.	E	(80)
29.	B	(83)
30.	A	(86)
31.	A	(89)
32.	C	(92)



Individual Learning Program

In

AMATEUR RADIO

(NOVICE LICENSE)

2

RADIO
PHENOMENA





Individual Learning Program

AMATEUR RADIO (NOVICE LICENSE)

Module 2 RADIO PHENOMENA ER-3701

HEATH COMPANY
BENTON HARBOR, MICHIGAN 49022

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MODULE OBJECTIVES

When you complete this Module, you will be able to select:

1. The definition of "ionosphere."
2. The definition of "ground wave."
3. The definition of "sky wave."
4. The definition of "skip distance."
5. The definition of "skip zone."
6. The definition of "sunspot cycle."
7. The relationship between hertz, kilohertz, and megahertz.
8. What the length in meters of one cycle of a radio wave is called.
9. The amateur bands that give the best range during the daytime.
10. The amateur bands that are most reliable during the nighttime.
11. The amateur bands that give the most distance during the summer months.
12. The amateur bands that give the best distance during the winter months.
13. The velocity of a radio wave in space.
14. The wavelength of a radio wave when you are given the frequency.
15. The frequency of a radio wave when you are given the wavelength.
16. The part of the radio spectrum that gives long-range communications by way of the ionosphere.

MODULE PRETEST

This examination will test your knowledge of the material presented in this module. For each question, circle the multiple choice answer (A, B, C, D, or E) you feel is most correct. When you have completed these questions, compare the answers with the correct ones that appear under "Pretest Answers," which follows.

- If you miss more than three questions, read this whole module.
- If you have less than three incorrect answers, you may either study those frames pertaining to the questions you missed (the number in parenthesis, following the correct answer, refers you to the proper frame) or, you can skip this module and proceed to the next module.

1. What is the layer of ionized gases above the earth called?

- A. The 50-mile layer.
- B. The troposphere.
- C. The radio region.
- D. The ionosphere.
- E. The atmosphere.

2. What is the radio wave that travels along the ground called?

- A. A sky wave.
- B. An earth wave.
- C. A neutral wave.
- D. A surface wave.
- E. A ground wave.

3. What is a radio wave that travels upward, is bent by the ionosphere, and returns to the earth called?

- A. A ground wave.
- B. A sky wave.
- C. A bounce wave.
- D. A refracting wave.
- E. An atmospheric wave.

4. What is the distance between the transmitter and the first bounce of the sky wave called?
 - A. The skip distance.
 - B. The ground wave distance.
 - C. The skip zone.
 - D. The bounce distance.
 - E. The transmitter's maximum range.
5. What is the distance between the ground wave range and the point where the sky wave first strikes the earth called?
 - A. The skip distance.
 - B. The strike distance.
 - C. The skip zone.
 - D. The ground wave distance.
 - E. The bounce difference.
6. What is the 11-year cycle which causes changes in the layers of the ionosphere called?
 - A. The atmospheric cycle.
 - B. The sunspot cycle.
 - C. The wavelength.
 - D. The 11-year cycle.
 - E. The ionospheric cycle.
7. What is the frequency 7150 kHz in MHz?
 - A. 7.15 MHz.
 - B. 71.5 MHz.
 - C. 715 MHz.
 - D. 40 MHz.
 - E. .715 MHz.
8. What is the length in meters of one cycle of a radio wave called?
 - A. Kilohertz.
 - B. Megahertz.
 - C. Hertz.
 - D. Wavelength.
 - E. All of the above.

9. Which amateur bands give the best results during the daytime?
- A. The 15- and 10-meter bands.
 - B. The 15- and 10-megahertz bands.
 - C. The 80- and 40-meter bands.
 - D. The 80- and 40-megahertz bands.
 - E. The 80- and 40-kilohertz bands.
10. Which amateur bands give the best results during the nighttime?
- A. The 15- and 10-meter bands.
 - B. The 80- and 40-meter bands.
 - C. The 80- and 40-megahertz bands.
 - D. The 15- and 10-megahertz bands.
 - E. The 80- and 40-kilohertz bands.
11. Which amateur bands give the best distance during the summer months?
- A. The 15- and 10-megahertz bands.
 - B. The 80- and 40-meter bands.
 - C. The 15- and 10-meter bands.
 - D. The 80- and 40-megahertz bands.
 - E. The 15- and 10-kilohertz bands.
12. Which amateur bands give the best distance during the winter months?
- A. The 15- and 10-meter bands.
 - B. The 80- and 40-kilohertz bands.
 - C. The 80- and 40-megahertz bands.
 - D. The 15- and 10-megahertz bands.
 - E. The 80- and 40-meter bands.
13. What is the velocity of a radio wave in space?
- A. 300,000,000 feet per second.
 - B. 300,000 meters per second.
 - C. 3,000 meters per second.
 - D. 300,000,000 meters per second.
 - E. 300 meters per second.

14. What is the wavelength of 15,000 kHz?
- A. 20 meters.
 - B. .2 meters.
 - C. 2 meters.
 - D. 200 meters.
 - E. 2000 meters.
15. What is the frequency of 40 meters?
- A. .75 megahertz.
 - B. 7500 megahertz.
 - C. 750 megahertz.
 - D. 7.5 megahertz.
 - E. 75 megahertz.
16. Long range communications by way of the ionosphere are generally limited to which part of the radio spectrum?
- A. The HF portion.
 - B. The UHF portion.
 - C. The microwave portion.
 - D. The VHF portion.
 - E. None of the above.

PRETEST ANSWERS

<u>Q</u>	<u>A</u>	<u>FRAME NO.</u>
1.	D	(1)
2.	E	(2)
3.	B	(4)
4.	A	(7)
5.	C	(10)
6.	B	(13)
7.	A	(16)
8.	D	(19)
9.	A	(22)
10.	B	(25)
11.	C	(28)
12.	E	(31)
13.	D	(34)
14.	A	(37)
15.	D	(40)
16.	A	(43)

INTRODUCTION

Radio communication is not the same at all hours of the day or at all times of the year. Even though both radio waves and the atmosphere above the earth are invisible, the atmosphere plays an important role in radio communications. Things happening on the sun, even though it is about 93 million miles away, also have a direct effect on your communications. This module on "Radio Phenomena" will show you how the condition of the atmosphere affects radio communication.

PROGRAMMED INSTRUCTION

1. About 50 miles above the earth is the beginning of a region made up of several layers of ionized gases. This region plays an important role in radio communication.

The region of ionized gases above the earth is called the "ionosphere."

Even though the ionosphere is made up of several layers, it is often referred to as a single layer.

The region of ionized gases above the earth is called the _____

ionosphere

2. High frequency (HF) radio waves travel two (for all practical purposes) routes (see Figure 2-1). One route is along the ground, and the other is upward toward the ionosphere.

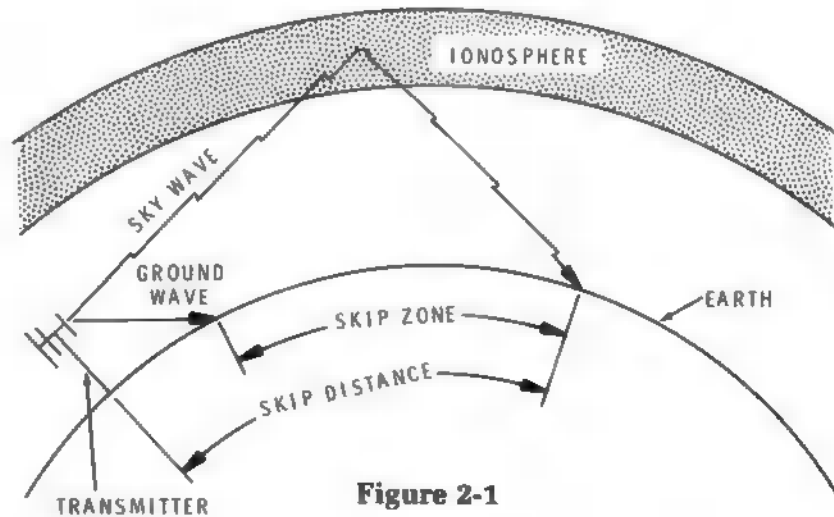


Figure 2-1

A radio wave that travels along the ground is called a "ground wave."

As shown, the distance a ground wave travels depends largely on the curvature of the earth's surface.

A radio wave that travels along the ground is called a _____.

ground wave

3. What is the region of ionized gases above the earth called?

- A. The troposphere.
- B. The ionosphere.
- C. The radio region.
- D. The 50-mile high region.
- E. None of the above.

B

4. As mentioned earlier, some radio waves travel upward toward the ionosphere. When these radio waves strike the ionosphere, the waves are refracted (bent) back toward the earth. Refer again to Figure 2-1.

A radio wave that travels upward, is bent by the ionosphere, and returns to the earth is called a "sky wave."

As you can see from the Figure, sky waves travel a farther distance than the ground wave. The distance depends on the height and condition of the ionosphere at a given time.

A radio wave that travels upward, is bent by the ionosphere, and returns to the earth is called a _____.

sky wave

5. What is a radio wave that travels along the ground called?

- A. A ground wave.
- B. A neutral wave.
- C. A sky wave.
- D. An earth wave.
- E. A surface wave.

A

6. What is the layer of ionized gases above the earth called?

- A. The 50-mile layer.
- B. The troposphere.
- C. The radio region.
- D. The ionosphere.
- E. The atmosphere.

D

7. Even though only one sky wave bounce is shown in the illustration, these waves can bounce several times between the earth and the ionosphere.

The distance between the transmitter and the first bounce of the sky wave on the earth is called the skip distance.

The distance between the transmitter and the first bounce of the sky wave on the earth is called the _____.

skip distance

8. What is a radio wave that travels upward, is bent by the ionosphere, and returns to the earth called.

- A. A sky wave.
- B. A ground wave.
- C. An atmospheric wave.
- D. A bouncing wave.
- E. A refracting wave.

A

9. What is the radio wave that travels along the ground called.

- A. A sky wave.
- B. An earth wave.
- C. A neutral wave.
- D. A surface wave.
- E. A ground wave.

E

10. In contrast to the skip distance (which was the distance between the transmitter and the first bounce of the sky wave), there is an area called the skip zone.

The skip zone is the difference between the ground wave range and the point where the sky wave first strikes the earth.

A receiver in the skip zone will most likely not receive the signal from the transmitter, since the ground wave signal has diminished to nothing and the sky wave bounces over the receiver.

The difference between the ground wave range and the point where the sky wave first strikes the earth is called the _____.

skip zone

11. What is the distance between the transmitter and the first bounce of the sky wave on the earth called?

- A. The skip zone.
- B. The ground wave distance.
- C. The skip distance.
- D. The bounce distance.
- E. The transmitter's maximum range.

C

12. What is a radio wave that travels upward, is bent by the ionosphere, and returns to the earth called?

- A. A ground wave.
- B. A sky wave.
- C. A bounce wave.
- D. A refracting wave.
- E. An atmospheric wave.

B

13. The ionized layers in the ionosphere change in density and distance above the earth in 11-year cycles (approximate). The number of sunspots occurring on the sun cause these changes which proportionally affect radio waves.

The 11-year cycle which causes changes in the layers of the ionosphere is called the "sunspot cycle."

As shown in Figure 2-2, the more sunspots at a given time, the higher the ionized layers are above the earth. This, in turn, increases the skip distance which increases the transmitter's range.

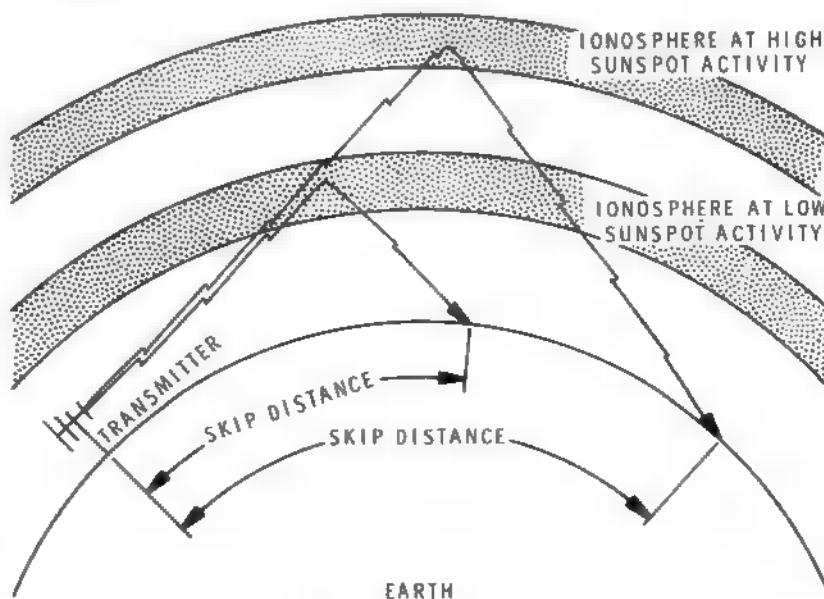


Figure 2-2

The 11-year cycle which causes changes in the layers of the ionosphere is called the _____.

sunspot cycle

14. What is the difference between the ground wave range and the point where the sky wave first strikes the earth called?

- A. The bounce difference.
- B. The ground wave distance.
- C. The skip distance.
- D. The skip zone.
- E. The strike distance.

D

15. What is the distance between the transmitter and the first bounce of the sky wave called?

- A. The skip distance.
- B. The ground wave distance.
- C. The skip zone.
- D. The bounce distance.
- E. The transmitter's maximum range.

A

- 16.** Frequency is measured in hertz (Hz), kilohertz (kHz), or megahertz (MHz). There is a direct relationship between these three measurements just as there is between inches, feet, and yards.

$$1000 \text{ Hz} = \text{kHz}$$

$$1000 \text{ kHz} = 1 \text{ MHz (or } 1,000,000 \text{ Hz} = 1 \text{ MHz)}$$

To convert between Hz, kHz, and MHz, apply this information in the following examples.

EXAMPLE 1: What is the frequency 3700 kHz in MHz?

$1000 \text{ kHz} = 1 \text{ MHz}$, and $3700 \text{ kHz} = 3.700 \text{ MHz}$.
(normally the zeros are dropped, which leaves 3.7 MHz).

EXAMPLE 2: What is the frequency 7.150 MHz in kHz?

Since $1000 \text{ kHz} = 1 \text{ MHz}$, then $7.150 \text{ MHz} = 7150 \text{ kHz}$.

The frequency 21,150 kHz is the same as _____ MHz.

21.15

- 17.** What is the 11-year cycle which causes changes in the layers of the ionosphere called?

- A. The 11-year cycle.
- B. The ionospheric cycle.
- C. The sun cycle.
- D. The atmospheric cycle.
- E. The sunspot cycle.

E

18. What is the difference between the ground wave range and the point where the sky wave first strikes the earth called?

- A. The skip distance.
- B. The strike distance.
- C. The skip zone.
- D. The ground wave distance.
- E. The bounce difference.

C

19. In Module 1, frequency is measured in both kHz (or MHz) and meters.

The length in meters of one cycle of a radio wave is called "wavelength."

To convert the frequency in Hz to the wavelength in meters, divide 300,000,000 by the frequency.

The length in meters of one cycle of a radio wave is called _____.

wavelength

20. What is the frequency 3.75 MHz in kHz?

- A. 375 kHz.
- B. 37.5 kHz.
- C. 3750 kHz.
- D. .375 kHz.
- E. 80 kHz.

C

21. What is the 11-year cycle which causes changes in the layers of the ionosphere called?

- A. The atmospheric cycle.
- B. The sunspot cycle.
- C. The wavelength.
- D. The 11-year cycle.
- E. The ionospheric cycle.

B

22. The amateur bands (80, 40, 15, and 10 meters) do not give the same results at all hours of the day.

During the daytime, the 15- and 10-meter bands usually give the best range.

The usefulness of each band depends highly on the date, time of day, and sunspot activity.

During the daytime, the _____- and _____-meter bands usually give the best range.

15, 10

23. What is the length in meters of one cycle of a radio wave called?

- A. Kilohertz.
- B. Megahertz.
- C. Hertz.
- D. Wavelength.
- E. All of the above.

D

24. What is the frequency 7150 kHz in MHz?

- A. 7.15 MHz.
- B. 71.5 MHz.
- C. 715 MHz.
- D. 40 MHz.
- E. .715 MHz.

A

25. During the nighttime, the 80- and 40-meter bands are the most reliable.

Again, the usefulness of these bands is affected by the same factors as the daytime bands.

During the nighttime, the _____- and _____-meter bands are the most reliable.

80, 40

26. Which amateur bands give the best results during the daytime?

- A. The 80- and 40-meter bands.
- B. The 80- and 40-megahertz bands.
- B. The 15- and 10-kilohertz bands.
- D. The 15- and 10-megahertz bands.
- E. The 15- and 10-meter bands.

E

27. What unit is wavelength expressed in?

- A. Megahertz.
- B. Meters.
- C. Kilohertz.
- D. Hertz.
- E. None of the above.

B

28. As we previously mentioned, the amateur bands do not give the same results at all times of the day. Another condition that affects the amateur bands is the season.

The 15- and 10-meter amateur bands give the best distance during the summer months.

The _____- and _____-meter amateur bands give the best distance during the summer months.

15, 10

29. Which amateur bands give the best results during the nighttime?

- A. The 15- and 10-meter bands.
- B. The 80- and 40-megahertz bands.
- C. The 80- and 40-meter bands.
- D. The 15- and 10-megahertz bands.
- E. The 80- and 40-kilohertz bands.

C

30. Which amateur bands give the best results during the daytime?

- A. The 15- and 10-meter bands.
- B. The 15- and 10-megahertz bands.
- C. The 80- and 40-meter bands.
- D. The 80- and 40-megahertz bands.
- E. The 80- and 40-kilohertz bands.

A

31. The 80- and 40-meter amateur bands give the best distance during the winter months.

The _____- and _____-meter amateur bands give the best distance during the winter months.

80, 40

32. Which amateur bands give the best distance during the summer months?

- A. The 15- and 10-kilohertz bands.
- B. The 15- and 10-megahertz bands.
- C. The 80- and 40-meter bands.
- D. The 15- and 10-meter bands.
- E. The 80- and 40-megahertz bands.

D

33. Which amateur bands give the best results during the nighttime?

- A. The 15- and 10-meter bands.
- B. The 80- and 40-meter bands.
- C. The 80- and 40-megahertz bands.
- D. The 15- and 10-megahertz bands.
- E. The 80- and 40-kilohertz bands.

B

34. Earlier, you learned that the length in meters of one cycle of a radio wave is called wavelength.

The velocity (speed) of a radio wave in space is 300,000,000 meters per second.

The velocity of a radio wave in space is _____ meters per second.

300,000,000

35. Which amateur bands give the best distance during the winter months?

- A. The 15- and 10-meter bands.
- B. The 80- and 40-kilohertz bands.
- C. The 80- and 40-megahertz bands.
- D. The 15- and 10-megahertz bands.
- E. The 80- and 40-meter bands.

E

36. Which amateur bands give the best distance during the summer months?

- A. The 15- and 10-megahertz bands.
- B. The 80- and 40-meter bands.
- C. The 15- and 10-meter bands.
- D. The 80- and 40-megahertz bands.
- E. The 15- and 10-kilohertz bands.

C

37. As mentioned earlier, frequency can be expressed in terms of hertz (or kilohertz and megahertz) or wavelength in meters.

To find the wavelength in meters (when you are given the frequency in hertz), divide 300,000,000 by the frequency in hertz.

EXAMPLE: What is the wavelength of 7,100 kHz?

First, change kilohertz to hertz (7100 kHz = 7,100,000 Hz).

Now, divide 300,000,000 by 7,100,000 Hz.

$$\frac{300,000,000}{7,100,000} = 42.25 \text{ meters}$$

To find the wavelength in meters, divide _____ by the frequency in _____.

300,000,000 hertz

38. What is the velocity of a radio wave in space?

- A. 300,000,000 meters per second.
- B. 300,000,000 feet per second.
- C. 300,000 meters per second.
- D. 300 meters per second.
- E. 300,000 feet per second.

A

39. Which amateur bands give the best distance during the winter months?

- A. The 15- and 10-meter bands.
- B. The 80- and 40-kilohertz bands.
- C. The 80- and 40-megahertz bands.
- D. The 15- and 40-megahertz bands.
- E. The 80- and 40-meter bands.

E

40. To find the frequency of a wavelength, divide 300,000,000 by the wavelength.

EXAMPLE: What is the frequency of 80 meters?

$$300,000,000 \div 80 = 3,750,000 \text{ hertz.}$$

NOTE: 3,750,000 hertz is the same as 3,750 kilohertz or 3.75 megahertz.

To find the frequency of a wavelength, divide _____ by the _____.

300,000,000 wavelength

41. What is the wavelength of 21.2 megahertz?

- A. 1.415 meters.
- B. 14.15 meters.
- C. 141.5 meters.
- D. 1415 meters.
- E. .1415 meters.

B

42. What is the velocity of a radio wave in space?

- A. 300,000 meters per second.
- B. 300,000,000 feet per second.
- C. 300 meters per second.
- D. 300,000,000 meters per second.
- E. 300,000 feet per second.

D

43. Since frequencies above about 30 megahertz **pass through** the ionosphere, they are not good for long-range communications.

Long-range communications by way of the ionosphere are generally limited to the HF (high frequency) spectrum.

VHF (very high frequencies), UHF (ultra high frequencies), and microwaves are not good for long-range communications.

Long-range communications by way of the ionosphere are generally limited to the _____ spectrum.

high frequency (HF)

44. What is the frequency of 10 meters?

- A. 300 megahertz.
- B. 3 megahertz.
- C. 30 megahertz.
- D. 3000 megahertz.
- E. .3 megahertz.

C

45. What is the wavelength of 15,000 kHz?

- A. 20 meters.
- B. .2 meters.
- C. 2 meters.
- D. 200 meters.
- E. 2000 meters.

A

46. Long range communications by way of the ionosphere are generally limited to what part of the radio spectrum?

- A. The VHF portion.
- B. The HF portion.
- C. The UHF portion.
- D. The microwave portion.
- E. None of the above.

B

47. What is the frequency of 40 meters?

- A. .75 megahertz.
- B. 7500 megahertz.
- C. 750 megahertz.
- D. 7.5 megahertz.
- E. 75 megahertz.

D

48. Long range communications by way of the ionosphere are generally limited to which part of the radio spectrum?

- A. The HF portion.
- B. The UHF portion.
- C. The microwave portion.
- D. The VHF portion.
- E. None of the above.

A

MODULE EXAMINATION

This examination will test your knowledge of the material presented in this module. For each question, circle the multiple choice answer (A, B, C, D, or E) you feel is most correct. When you have completed these questions, compare your answers with the correct ones that appear under "Examination Answers," which follows.

- If you miss more than three questions, go back and re-read this whole module.
 - If you have less than three incorrect answers, go back and study those frames pertaining to the questions you missed (the number in parenthesis, following the correct answer, refers you to the proper frame). Then proceed to the next module.
-
1. What is the layer of ionized gases above the earth called?
 - A. The 50-mile layer.
 - B. The troposphere.
 - C. The radio region.
 - D. The ionosphere.
 - E. The atmosphere.

 2. What is the radio wave that travels along the ground called?
 - A. A sky wave.
 - B. An earth wave.
 - C. A neutral wave.
 - D. A surface wave.
 - E. A ground wave.

 3. What is a radio wave that travels upward, is bent by the ionosphere, and returns to the earth called?
 - A. A ground wave.
 - B. A sky wave.
 - C. A bounce wave.
 - D. A refracting wave.
 - E. An atmospheric wave.

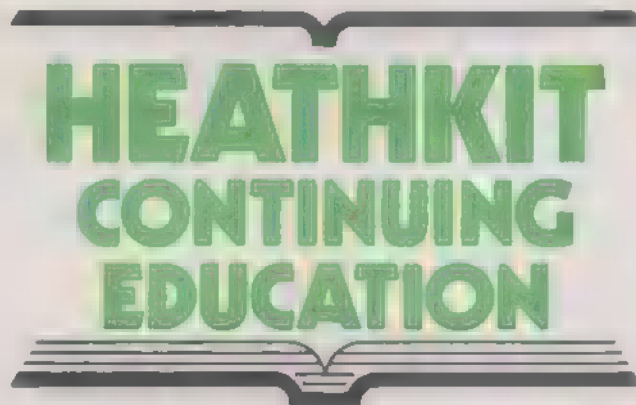
4. What is the distance between the transmitter and the first bounce of the sky wave called?
 - A. The skip distance.
 - B. The ground wave distance.
 - C. The skip zone.
 - D. The bounce distance.
 - E. The transmitter's maximum range.
5. What is the distance between the ground wave range and the point where the sky wave first strikes the earth called?
 - A. The skip distance.
 - B. The strike distance.
 - C. The skip zone.
 - D. The ground wave distance.
 - E. The bounce difference.
6. What is the 11-year cycle which causes changes in the layers of the ionosphere called?
 - A. The atmospheric cycle.
 - B. The sunspot cycle.
 - C. The wavelength.
 - D. The 11-year cycle.
 - E. The ionospheric cycle.
7. What is the frequency 7150 kHz in MHz?
 - A. 7.15 MHz.
 - B. 71.5 MHz.
 - C. 715 MHz.
 - D. 40 MHz
 - E. .715 MHz.
8. What is the length in meters of one cycle of a radio wave called?
 - A. Kilohertz.
 - B. Megahertz.
 - C. Hertz.
 - D. Wavelength.
 - E. All of the above.

9. Which amateur bands give the best results during the daytime?
- A. The 15- and 10-meter bands.
 - B. The 15- and 10-megahertz bands.
 - C. The 80- and 40-meter bands.
 - D. The 80- and 40-megahertz bands.
 - E. The 80- and 40-kilohertz bands.
10. Which amateur bands give the best results during the nighttime?
- A. The 15- and 10-meter bands.
 - B. The 80- and 40-meter bands.
 - C. The 80- and 40-megahertz bands.
 - D. The 15- and 10-megahertz bands.
 - E. The 80- and 40-kilohertz bands.
11. Which amateur bands give the best distance during the summer months?
- A. The 15- and 10-megahertz bands.
 - B. The 80- and 40-meter bands.
 - C. The 15- and 10-meter bands.
 - D. The 80- and 40-megahertz bands.
 - E. The 15- and 10-kilohertz bands.
12. Which amateur bands give the best distance during the winter months?
- A. The 15- and 10-meter bands.
 - B. The 80- and 40-kilohertz bands.
 - C. The 80- and 40-megahertz bands.
 - D. The 15- and 10-megahertz bands.
 - E. The 80- and 40-meter bands.
13. What is the velocity of a radio wave in space?
- A. 300,000,000 feet per second.
 - B. 300,000 meters per second.
 - C. 3,000 meters per second.
 - D. 300,000,000 meters per second.
 - E. 300 meters per second.

14. What is the wavelength of 15,000 kHz?
- A. 20 meters.
 - B. .2 meters.
 - C. 2 meters.
 - D. 200 meters.
 - E. 2000 meters.
15. What is the frequency of 40 meters?
- A. .75 megahertz.
 - B. 7500 megahertz.
 - C. 750 megahertz.
 - D. 7.5 megahertz.
 - E. 75 megahertz.
16. Long range communications by way of the ionosphere are generally limited to which part of the radio spectrum?
- A. The HF portion.
 - B. The UHF portion.
 - C. The microwave portion.
 - D. The VHF portion.
 - E. None of the above.

EXAMINATION ANSWERS

<u>Q</u>	<u>A</u>	<u>FRAME NO.</u>
1.	D	(1)
2.	E	(2)
3.	B	(4)
4.	A	(7)
5.	C	(10)
6.	B	(13)
7.	A	(16)
8.	D	(19)
9.	A	(22)
10.	B	(25)
11.	C	(28)
12.	E	(31)
13.	D	(34)
14.	A	(37)
15.	D	(40)
16.	A	(43)



Individual Learning Program
In

AMATEUR RADIO
(NOVICE LICENSE)

3

**OPERATING
PROCEDURES**



HEATHKIT
CONTINUING
EDUCATION

Individual Learning Program

AMATEUR RADIO

(NOVICE LICENSE)

Module 3 **OPERATING PROCEDURES**

ER-3701

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MODULE OBJECTIVES

When you complete this module, you will be able to select:

1. The three basic good operating habits.
2. The proper methods of picking a frequency.
3. The definition of "Q" signals.
4. The meaning of "QRM."
5. The meaning of "QRS."
6. The meaning of "QRU."
7. The meaning of "QRZ."
8. The meaning of "QSL."
9. The meaning of "QTH."
10. The meaning of "RST."
11. The correct code speed to use to answer another station.
12. The meaning of "CQ."
13. The meaning of "DE."
14. The meaning of "EST."
15. The meaning of "UTC."
16. The meaning of "CW."
17. The meaning of "AR."
18. The meaning of "SK."
19. The meaning of "K."
20. The meaning of "DX."
21. When operation is permitted on emergency frequencies.

MODULE PRETEST

This examination will test your knowledge of the material presented in this module. For each question, circle the multiple choice answer (A, B, C, D, or E) you feel is most correct. When you have completed these questions, compare your answers with the correct ones that appear under "Pretest Answers," which follows.

- If you miss more than four questions, read this whole module.
- If you have less than four incorrect answers, you may either study those frames pertaining to the questions you missed (the number in parentheses, following the correct answer, refers you to the proper frame) or you can skip this module and proceed to the next module.

1. Which of the following is a good operating habit?
 - A. Listen on a frequency to see if it is in use before you transmit.
 - B. Use a dummy load when you tune up or adjust a transmitter.
 - C. Use the minimum power necessary to maintain communications.
 - D. Use courtesy.
 - E. All of the above.
2. Which of the following should you do when you select an operating frequency?
 - A. Avoid interfering with existing communications.
 - B. Consider the bandwidth of the type of emission you are going to use.
 - C. Select a band that will give you the desired distance.
 - D. Listen for a clear frequency within the band.
 - E. All of the above.
3. What is a Q signal?
 - A. A secret code.
 - B. A report of signal quality.
 - C. A call for any station to answer.
 - D. A type of abbreviation for common messages and questions.
 - E. A distress call.

4. What does QRM? mean?

- A. You are sending too fast.
- B. Am I being interfered with?
- C. Do you have a radio message for my station?
- D. You are being interfered with.
- E. Do you have anything for me?

5. What does QRS? mean?

- A. You are sending too fast.
- B. Who is calling me?
- C. Am I sending too fast?
- D. Do you have anything for me?
- E. Am I being interfered with?

6. What does QRU mean?

- A. I have nothing for you.
- B. You are being interfered with.
- C. You are being called by
- D. You are sending too fast.
- E. Do you have anything for me?

7. What does QRZ mean?

- A. Who is calling me?
- B. You are sending too fast.
- C. I have nothing for you.
- D. You are being called by
- E. None of the above.

8. What does QSL mean?

- A. I acknowledge receipt.
- B. I have nothing for you.
- C. You are being called by
- D. Can you acknowledge receipt?
- E. You are sending too fast.

9. What does QTH? mean?
- A. My location is
 - B. What is your location?
 - C. Who is calling me?
 - D. Am I sending too fast?
 - E. Do you have anything for me?
10. Which of the following is the best signal report?
- A. 599.
 - B. 579K.
 - C. 599X.
 - D. 599C.
 - E. 111.
11. What code speed should you use when you are communicating with another station?
- A. 13 words per minute.
 - B. 5 words per minute.
 - C. As fast as you can send it.
 - D. As fast as you can copy it.
 - E. Same speed as the other station.
12. Which of the following is a general call for any station?
- A. A question mark.
 - B. CQ.
 - C. QC.
 - D. QRZ?
 - E. DE.
13. Which of the following should you use in place of "this is" in code?
- A. CQ.
 - B. QSL.
 - C. DE.
 - D. "From."
 - E. =.

14. Which of the following is the abbreviation for Eastern Standard Time?
- A. ETS.
 - B. UTC.
 - C. EST.
 - D. UCT.
 - E. GMT.
15. Which of the following is the abbreviation for Universal Coordinated Time?
- A. EST.
 - B. UTC.
 - C. GMT.
 - D. UCT.
 - E. Zulu.
16. Which of the following is the **abbreviation** for continuous waves.
- A. $\overline{\text{CW}}$.
 - B. A1.
 - C. QCW.
 - D. Code.
 - E. CW.
17. Which of the following letter groups means "end of message?"
- A. $\overline{\text{EM}}$.
 - B. $\overline{\text{SK}}$.
 - C. $\overline{\text{AR}}$.
 - D. AR.
 - E. K.
18. Which of the following means "end of communication, no reply is expected?"
- A. SK.
 - B. $\overline{\text{AR}}$.
 - C. AR.
 - D. $\overline{\text{SK}}$.
 - E. K.

19. Which of the following means "go ahead" or "over?"

- A. K.
- B. CW.
- C. SK.
- D. AR.
- E. DE.

20. Which of the following means distant?

- A. DE.
- B. DX.
- C. DX.
- D. DT.
- E. QTH.

21. Which must you do on an emergency frequency?

- A. Operate as usual if you were already using the frequency.
- B. Cease all operation on all frequencies.
- C. Cease operation on the emergency frequency unless you are legitimately participating in the emergency.
- D. Listen only.
- E. None of the above.

PRETEST ANSWERS

<u>Q</u>	<u>A</u>	<u>FRAME NO.</u>
1.	E.	(1)
2.	E	(2)
3.	D	(4)
4.	B	(7)
5.	C	(10)
6.	A	(13)
7.	D	(16)
8.	A	(19)
9.	B	(22)
10.	C	(25)
11.	E	(28)
12.	■	(32)
13.	C	(35)
14.	C	(38)
15.	■	(41)
16.	E	(44)
17.	C	(47)
18.	D	(50)
19.	A	(53)
20.	B	(56)
21.	C	(59)

INTRODUCTION

Amateur radio operators often use abbreviations to reduce the length of radio messages. Abbreviations are used occasionally in voice communications but are used to a much greater extent in code (CW) operation. You will probably learn many abbreviations during your first few contacts on the air. This module, therefore, will only cover the most common ones. This module will also teach you some proper operating techniques.

PROGRAMMED INSTRUCTION

1. Since there are more than 500,000 amateur radio operators in the world, some method must be used to minimize interference between stations and congestion within the amateur bands.

The three basic good operating habits that each amateur should abide by are:

1. **Use the minimum power necessary to maintain communications.**
2. **Listen on a frequency to see if it is in use before you transmit.**
3. **Use a dummy load when you tune up or adjust your transmitter.**

The three basic good operating habits that each amateur should abide by are:

1. Use the _____ power necessary to maintain communications.
2. _____ on a frequency to see if it is in use before you transmit.
3. Use a _____ load when you tune up or adjust your transmitter.

minimum, listen, dummy

2. Although there are many frequencies where amateurs may operate, there are three things you should do before you select an operating frequency.

The three things you should do when you select an operating frequency are:

1. **Select the band that will give the distance you desire.**
2. **Listen for a clear frequency within the band.**
3. **Consider the bandwidth of the type of emission you are going to use when you are operating near a band edge.**

The bandwidth of an A1 signal (authorized for novices) in hertz is approximately equal to four times the code speed in words per minute.

The three things you should do when you select an operating frequency are:

1. _____ the band that will give the _____ you desire.
2. _____ for a clear frequency within the band.
3. Consider the _____ of the type of emission you are going to use when you operate near a band edge.

Select, distance, Listen, bandwidth

3. Which of the following is **not** a good operating habit?

- A. Use the maximum power you are authorized.
- B. Use the minimum power necessary to maintain communications.
- C. Listen on a frequency to see if it is in use before you transmit.
- D. Use a dummy load when you tune up or adjust your transmitter.
- E. All of the above.

A

4. Amateur radio operators (as well as some other services) use a type of abbreviation called "Q signals."

The purpose of Q signals is to shorten commonly used radio messages and questions.

Each Q signal can be changed to a question by simply adding a question mark after it.

Amateur radio operators use a type of abbreviation called "_____."

Q signals

5. Which of the following should **not** be done when you are selecting an operating frequency?

- A. Select a band that will give you the desired distance.
- B. Consider the bandwidth of the type of emission you are going to use.
- C. Listen for a clear frequency within the band.
- D. Avoid interference to existing communications.
- E. None of the above.

E

6. Which of the following is a good operating habit?

- A. Listen on a frequency to see if it is in use before you transmit.
- B. Use a dummy load when you tune up or adjust a transmitter.
- C. Use the minimum power necessary to maintain communications.
- D. Use courtesy.
- E. All of the above.

E

7. QRM means "you are being interfered with."

Likewise, QRM? means "Am I being interfered with?"

The Q signal for "You are being interfered with" is _____.

QRM

8. A Q signal is

- A. A report of signal quality.
- B. A secret code.
- C. A type of abbreviation for common messages and questions.
- D. A call for any station to answer.
- E. A distress call.

C

9. Which of the following should be done when you select an operating frequency?

- A. Avoid interference to existing communications.
- B. Consider the bandwidth of the type of emission you are going to use.
- C. Select a band that will give you the desired distance.
- D. Listen for a clear frequency within the band.
- E. All of the above.

E

10. QRS means "You are sending too fast for me."

Similarly, QRS? means "Am I sending too fast for you?"

The Q signal for "You are sending too fast" is _____.

QRS

11. What does QRM mean?

- A. You are sending too fast.
- B. You are being interfered with.
- C. I have a radio message for your station.
- D. I am a message route manager.
- E. Am I being interfered with?

B

12. A Q signal is

- A. A secret code.
- B. A report of signal quality.
- C. A call for any station to answer.
- D. A type of abbreviation for common messages and questions.
- E. A distress call.

D

13. QRU means "I have nothing for you."

QRU? means "Do you have anything for me?"

The Q signal for "I have nothing for you" is _____.

QRU

14. What does QRS mean?

- A. You are sending too fast.
- B. You are being interfered with.
- C. You are sending too slow.
- D. I have nothing for you.
- E. Am I sending too fast?

A

15. What does QRM? mean?

- A. You are sending too fast.
- B. Am I being interfered with?
- C. Do you have a radio message for my station?
- D. You are being interfered with.
- E. Do you have anything for me?

B

16. QRZ means "You are being called by"

QRZ? means "Who is calling me?" (This does **not** mean the same thing as "CQ," which you will learn later.)

The Q signal for "You are being called by " is _____.

QRZ.

17. What does QRU mean?

- A. You are being interfered with.
- B. Do you have anything for me?
- C. I have nothing for you.
- D. You are being called by
- E. You are sending too fast.

C

18. What does QRS? mean?

- A. You are sending too fast.
- B. Who is calling me?
- C. Am I being interfered with?
- D. Do you have anything for me?
- E. Am I sending too fast?

E

19. QSL means "I acknowledge receipt." (In other words, "I received the message okay.")

QSL? means "Can you acknowledge receipt?"

The Q signal for "I acknowledge receipt" is _____.

QSL

20. What does QRZ mean?

- A. Who is calling me?
- B. You are sending too fast.
- C. I have nothing for you.
- D. You are being called by
- E. None of the above.

D

21. What does QRU? mean?

- A. Do you have anything for me?
- B. I have nothing for you.
- C. Am I sending too fast?
- D. Am I being interfered with?
- E. Can you acknowledge receipt?

A

22. QTH means "My location is"

QTH? means "What is your location?"

The Q signal for "My location is" is _____.

QTH

23. What does QSL mean?

- A. I acknowledge receipt.
- B. I have nothing for you.
- C. You are being called by
- D. Can you acknowledge receipt?
- E. You are sending too fast.

A

24. What does QRZ? mean?

- A. Am I sending too fast?
- B. Who is calling me?
- C. Can you acknowledge receipt?
- D. Am I being interfered with?
- E. You are being called by

B

25. Amateur radio operators use a signal reporting system called the "RST system." The letters R, S, and T stand for Readability, Strength, and Tone as shown below.

THE R-S-T SYSTEM

READABILITY

- 1 — Unreadable.
- 2 — Barely readable, occasional words distinguishable.
- 3 — Readable with considerable difficulty.
- 4 — Readable with practically no difficulty.
- 5 — Perfectly readable.

SIGNAL STRENGTH

- 1 — Faint signals barely perceptible.
- 2 — Very weak signals.
- 3 — Weak signals.
- 4 — Fair signals.
- — Fairly good signals.
- 6 — Good signals.
- 7 — Moderately strong signals.
- 8 — Strong signals.
- 9 — Extremely strong signals.

tone

- 1 — Sixty hertz AC or less, very rough and broad.
- 2 — Very rough AC, very harsh sound.
- 3 — Rough AC tone, rectified but not filtered.
- 4 — Rough tone, some trace of filtering.
- 5 — Filtered rectified AC but strongly ripple-modulated.
- 6 — Filtered tone, definite trace of ripple modulation.
- 7 — Near pure tone, trace of ripple modulation.
- — Near perfect tone, slight trace of modulation.
- 9 — Perfect tone, no trace of ripple or modulation of any kind.

After the tone, the letter X can be added to signify that the signal is crystal steady. The letters C for chirp, K for clicks, or a combination of both can also be added.

EXAMPLE: A report of 589X means that your signal is perfectly readable, strong, and has a perfect tone quality that is very steady.

NOTE: The tone designation is not used in voice communications.

What does a report of 379C mean?

The signal is readable with considerable difficulty, moderately strong, is a perfect tone with chirp.

26. What does QTH mean?

- A. I acknowledge receipt.
- B. I have something for you.
- C. My location is
- D. What is your location?
- E. You are sending too fast.

C

27. What does QSL? mean?

- A. I acknowledge receipt.
- B. Who is calling me?
- C. Am I being interfered with?
- D. Am I sending too fast?
- E. Can you acknowledge receipt?

E

28. As you tune across the amateur bands, you will notice that all amateurs send the code at different speeds.

Always call or answer another amateur at his speed.

This will reasonably ensure you that you are sending at a speed that is comfortable to him.

Always call or answer another amateur at _____ speed.

his

29. Which of the following is an excellent signal report?

- A. 111.
- B. 378.
- C. 479.
- D. 599.
- E. 555.

D

30. What does QTH? mean?

- A. My location is
- B. What is your location?
- C. Who is calling me?
- D. Am I sending too fast?
- E. Do you have anything for me?

B

31. Write the number beside each of the following Q signals in the proper blanks at the right.

- 1. QTH. _____ You are being called by
- 2. QSL. _____ I have nothing for you.
- 3. QRZ. _____ I acknowledge receipt.
- 4. QRU. _____ You are sending too fast.
- 5. QRS. _____ You are being interfered with.
- 6. QRM. _____ My location is

3
4
2
5
6
1

32. "CQ" is a general call for any station.

Amateurs call CQ when they wish to talk to any station.

The general call for any station is _____.

CQ

33. What code speed should you use when you are communicating with another station?

- A. Same speed as the other station.
- B. As fast as you can send it.
- C. 5 words per minute.
- D. 13 words per minute.
- E. 10 words per minute.

A

34. Which of the following is the best signal report?

- A. 599.
- B. 579K.
- C. 599X.
- D. 599C.
- E. 111.

C

35. "DE" is used in place of "this is" when you use code.

As an example, assume that W3XYZ is calling W8XYZ. In voice, you would say "W8XYZ this is W3XYZ." In code, you would send "W8XYZ DE W3XYZ."

The abbreviation for "this is" is _____.

DE

36. Which of the following is a general call for any station?

- A. DE.
- B. QRZ?
- C. QC.
- D. A question mark.
- E. CQ.

E

37. What code speed should you use when you are communicating with another station?

- A. 13 words per minute.
- B. 5 words per minute.
- C. As fast as you can send it.
- D. As fast as you can copy it.
- E. Same speed as the other station.

E

38. EST is the common abbreviation for Eastern Standard Time.

The abbreviation for Eastern Standard Time is _____.

EST

39. Which of the following should you use in place of "this is" in code?

- A. CQ.
- B. QSL.
- C. "From."
- D. DE.
- E. None of the above.

D

40. Which of the following is a general call for any station?

- A. A question mark.
- B. CQ.
- C. QC.
- D. QRZ?
- E. DE.

B

41. Most amateurs refer to a universal time called Universal Coordinated Time. This helps amateurs all over the world convert the time into their own local time. It is much easier to remember the difference between Universal Coordinated Time and the local time than it is to remember what time the rest of the world is on.

The abbreviation for Universal Coordinated Time is UTC. (Note that the last two letters are interchanged from what you might expect them to be.)

Universal Coordinated Time was previously called Greenwich Mean Time (GMT). A conversion table is printed in the last Module of this course so you can convert your own local time to UTC. Usually, the word "zulu" or the letter "Z" is put behind the UTC time designation.

The abbreviation for Universal Coordinated Time is _____.

UTC

42. Which of the following is the abbreviation for Eastern Standard Time?

- A. EST.
- B. ETS.
- C. UTC.
- D. GMT.
- E. UCT.

A

43. Which of the following should you use in place of "this is" in code?

- A. CQ.
- B. QSL.
- C. DE.
- D. "From."
- E. =

C

44. CW is the abbreviation for continuous waves (or code).

The abbreviation for continuous waves is _____.

CW

45. Which of the following is the abbreviation for Universal Coordinated Time?

- A. GMT.
- B. UCT.
- C. EST.
- D. UTC.
- E. Z.

D

46. Which of the following is the abbreviation for Eastern Standard Time?

- A. ETS.
- B. UTC.
- C. EST.
- D. UCT.
- E. GMT.

C

47. When you use CW, there are a few letter groups which are actually abbreviations. One of these two-letter groups is $\overline{\text{AR}}$.

The letter group $\overline{\text{AR}}$ means "end of message."

The bar above the two letters indicate that these letters are run together on CW. In other words, there is no space between the letters (•—•—•).

The abbreviation for "end of message" is _____.

$\overline{\text{AR}}$

48. Which of the following is the **abbreviation** for continuous waves?

- A. Code.
- B. CW.
- C. A1.
- D. QRM.
- E. QCW.

B

49. Which of the following is the abbreviation for Universal Coordinated Time?

- A. EST.
- B. UTC.
- C. GMT.
- D. UCT.
- E. Zulu.

B

50. The letter group **$\overline{\text{SK}}$** means "end of communication, no reply is expected."

The letter group meaning "end of communication, no reply is expected" is _____.

$\overline{\text{SK}}$

51. Which of the following letter groups means "end of message?"

- A. AR.
- B. SK
- C. RA.
- D. EM.
- E. AR.

A

52. Which of the following is the **abbreviation** for continuous waves?

- A. CW.
- B. A1.
- C. QCW.
- D. Code.
- E. CW.

E

53. The letter K sent by itself at the end of a transmission means "go ahead" or "over."

Usually this letter K is sent with slightly longer dashes than the regular K.

The letter meaning "go ahead" or "over" is _____.

K

54. Which of the following means "end of communication, no reply is expected?"

- A. SK.
- B. AR.
- C. SK.
- D. AR.
- E. EC.

C

55. Which of the following letter groups means "end of message?"

- A. EM.
- B. SK.
- C. AR.
- D. AR.
- E. K.

C

56. DX means distant.

Usually DX refers to stations in foreign countries.

A distant station is called _____.

DX

57. Which of the following means "go ahead" or "over?"

- A. CW.
- B. SK.
- C. AR.
- D. K.
- E. DE.

D

58. Which of the following means "end of communication, no reply is expected?"

- A. SK.
- B. AR.
- C. AR.
- D. SK.
- E. K.

D

59. In an emergency, the FCC may declare certain frequencies as emergency frequencies.

You must not operate on an emergency channel unless you are legitimately participating in the emergency.

You must not operate on an emergency channel unless you are _____ in the emergency.

legitimately participating

60. Which of the following means distant?

- A. DT.
- B. DX.
- C. DX.
- D. DE.
- E. QTH.

B

61. Which of the following means "go ahead" or "over?"

- A. K.
- B. CW.
- C. SK.
- D. AR.
- E. DE.

A

62. What should you do on an emergency frequency?

- A. Cease operation on all frequencies.
- B. Operate as usual if you were already using the frequency.
- C. Operate as usual but clear off the frequency as soon as convenient.
- D. Listen only.
- E. Cease operation on the emergency frequency unless you are legitimately participating in the emergency.

E

63. Which of the following means distant?

- A. DE.
- B. DX.
- C. ~~DX~~.
- D. DT.
- E. QTH.

B

64. Write the number beside each of the following abbreviations in the proper blanks at the right.

- | | | |
|----|-----------|---|
| 1. | CQ | _____ Eastern Standard Time. |
| 2. | DE | _____ Continuous Waves. |
| 3. | EST | _____ "This is." |
| 4. | UTC | _____ "End of message." |
| 5. | CW | _____ A general call for any station. |
| 6. | <u>AR</u> | _____ "Go ahead" or "over." |
| 7. | <u>SK</u> | _____ Distant. |
| 8. | K | _____ Universal Coordinated Time. |
| 9. | DX | _____ "End of communication, no reply is expected." |

3
5
2
6
1
8
9
4
7

65. What must you do on an emergency frequency?

- A. Operate as usual if you were already using the frequency.
- B. Cease operation on all frequencies.
- C. Cease operation on the emergency frequency unless you are legitimately participating in the emergency.
- D. Listen only.
- E. None of the above.

C

MODULE EXAMINATION

This examination will test your knowledge of the material presented in this module. For each question, circle the multiple choice answer (A, B, C, D, or E) you feel is most correct. When you have completed these questions, compare your answers with the correct ones that appear under "Examination Answers," which follows.

- If you miss more than four questions, go back and re-read this whole module.
- If you have less than four incorrect answers, go back and study those frames pertaining to the questions you missed (the number in parenthesis, following the correct answer, refers you to the proper frame). Then proceed to the next module.

1. Which of the following is a good operating habit?
 - A. Listen on a frequency to see if it is in use before you transmit.
 - B. Use a dummy load when you tune up or adjust a transmitter.
 - C. Use the minimum power necessary to maintain communications.
 - D. Use courtesy.
 - E. All of the above.
2. Which of the following should you do when you select an operating frequency?
 - A. Avoid interfering with existing communications.
 - B. Consider the bandwidth of the type of emission you are going to use.
 - C. Select a band that will give you the desired distance.
 - D. Listen for a clear frequency within the band.
 - E. All of the above.

3. What is a Q signal?

- A. A secret code.
- B. A report of signal quality.
- C. A call for any station to answer.
- D. A type of abbreviation for common messages and questions.
- E. A distress call.

4. What does QRM? mean?

- A. You are sending too fast.
- B. Am I being interfered with?
- C. Do you have a radio message for my station?
- D. You are being interfered with.
- E. Do you have anything for me?

5. What does QRS? mean?

- A. You are sending too fast.
- B. Who is calling me?
- C. Am I sending too fast?
- D. Do you have anything for me?
- E. Am I being interfered with?

6. What does QRU mean?

- A. I have nothing for you.
- B. You are being interfered with.
- C. You are being called by
- D. You are sending too fast.
- E. Do you have anything for me?

7. What does QRZ mean?

- A. Who is calling me?
- B. You are sending too fast.
- C. I have nothing for you.
- D. You are being called by
- E. None of the above.

8. What does QSL mean?
- A. I acknowledge receipt.
 - B. I have nothing for you.
 - C. You are being called by
 - D. Can you acknowledge receipt?
 - E. You are sending too fast.
9. What does QTH? mean?
- A. My location is
 - B. What is your location?
 - C. Who is calling me?
 - D. Am I sending too fast?
 - E. Do you have anything for me?
10. Which of the following is the best signal report?
- A. 599.
 - B. 579K.
 - C. 599X.
 - D. 599C.
 - E. 111.
11. What code speed should you use when you are communicating with another station?
- A. 13 words per minute.
 - B. 5 words per minute.
 - C. As fast as you can send it.
 - D. As fast as you can copy it.
 - E. Same speed as the other station.
12. Which of the following is a general call for any station?
- A. A question mark.
 - B. CQ.
 - C. QC.
 - D. QRZ?
 - E. DE.

13. Which of the following should you use in place of "this is" in code?

- A. CQ.
- B. QSL.
- C. DE.
- D. "From."
- E. =.

14. Which of the following is the abbreviation for Eastern Standard Time?

- A. ETS.
- B. UTC.
- C. EST.
- D. UCT.
- E. GMT.

15. Which of the following is the abbreviation for Universal Coordinated Time?

- A. EST.
- B. UTC.
- C. GMT.
- D. UCT.
- E. Zulu.

16. Which of the following is the **abbreviation** for continuous waves.

- A. CW.
- B. A1.
- C. QCW.
- D. Code.
- E. CW.

17. Which of the following letter groups means "end of message?"

- A. EM.
- B. SK.
- C. AR.
- D. AR.
- E. K.

18. Which of the following means “end of communication, no reply is expected?”

- A. SK.
- B. AR.
- C. AR.
- D. SK.
- E. K.

19. Which of the following means “go ahead” or “over?”

- A. K.
- B. CW.
- C. SK.
- D. AR.
- E. DE.

20. Which of the following means distant?

- A. DE.
- B. DX.
- C. DX.
- D. DT.
- E. QTH.

21. Which must you do on an emergency frequency?

- A. Operate as usual if you were already using the frequency.
- B. Cease all operation on all frequencies.
- C. Cease operation on the emergency frequency unless you are legitimately participating in the emergency.
- D. Listen only.
- E. None of the above.

EXAMINATION ANSWERS

<u>Q</u>	<u>A</u>	<u>FRAME NO.</u>
1.	E.	(1)
2.	E	(2)
3.	D	(4)
4.	B	(7)
5.	C	(10)
6.	A	(13)
7.	D	(16)
8.	A	(19)
9.	H	(22)
10.	C	(25)
11.	E	(28)
12.	B	(32)
13.	C	(35)
14.	C	(38)
15.	B	(41)
16.	E	(44)
17.	C	(47)
18.	D	(50)
19.	A	(53)
20.	B	(56)
21.	C	(59)